

# AVIATION WEEK

A MCGRAW-HILL PUBLICATION

JUNE 23, 1952

50 CENTS

## Sure footing for the "Cutlass"



First-line U.S. Navy shipboard jet, the Chance Vought "CUTLASS" relies on Goodyear landing equipment for safe, sure stops.



Designed to out-fly and out-fight any shipboard jet, the new Chance Vought F7U "Cutlass"—like many of the outstanding aircraft now in production—relies on Goodyear for its main landing equipment.

Distinctive lines and outstanding performance distinguish this latest Navy fighter—just as dependable, sure stops and safe landings mark the performance of Goodyear landing equipment wherever it is used—in commercial applications as well as military.

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Goodyear, Aviation Products Division  
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## ZENITH "on the nose" in the Boeing YB-52

Equipped with eight of the world's most powerful jet engines, the giant YB-52 Boeing Stratofortress bomber is one of the most formidable fighting machines ever to take the air. Contributing to its strength are the fibreglass\* reinforced plastic nose parts produced by Zenith—engineered to perform, built to withstand the terrific stresses of supersonic speed. That's why both aircraft manufacturers and the U.S.A.F. consistently rely on Zenith parts.



For specific information and cooperation in both the civilian and military fields, consult our Engineering Division.

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Eastern Package Industries, Inc.

# Aviation Week

Volume 56

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Number 25

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## POWER...to guide the guided missiles...



**AirResearch develops a new  
auxiliary power package!**

To be successful a guided missile needs two kinds of power: (1) the propellant to drive it through the air, (2) auxiliary power to operate such vital elements as electrical and electronic guidance, instrumentation systems and surface controls. AirResearch is now producing this secondary power source in the form of a power package not much larger than a milk bottle!

This power package incorporates

a tiny 60,000 rpm oil-film flow turbine, reduction gear box, a 12,000 rpm induction generator and a gear-type hydraulic pump. In operation hot gases ignited in a gas generator are expanded through the turbine wheel to produce shaft power. The alternator and hydraulic pump convert shaft power into electrical and hydraulic energy. Performance figures are 2.75 gpm of oil at 2000 psi and 600

watts of 400 cycle, 115/200 volt, 3-phase alternating current. When neither brakes nor slip rings are used, this power package is well suited to missile applications where large changes of attitude are encountered and where radio noise problems are critical. Should you like to work with us? Good! Our engineers, technicians and skilled craftsmen are needed now at AirResearch in both Los Angeles and Phoenix.

## AirResearch Manufacturing Company

**A DIVISION OF THE GARRETT CORPORATION**  
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DESIGNER AND MANUFACTURER OF AIRCRAFT EQUIPMENT IN THESE MAJOR CATEGORIES:



10 Turbo-Propellers 200 Turbine Engines 2000 Air Turbines 2000 Air Turbines 2000 Air Turbines 2000 Air Turbines 2000 Air Turbines 2000 Air Turbines 2000 Air Turbines 2000 Air Turbines

**Flying**

**Tomorrow's**

**Jets**

➤ Sperry research engineers are seeking solutions for tomorrow's flight control problems while they develop new ways to better the performance of control equipment currently flying.

➤ This analog computer is duplicating flight conditions of a new high-performance jet bomber being flown automatically by the Gyrojet's flight control. Here, for instance, a Sperry engineer checks the performance of the airplane and automatic pilot during the bombing run.

➤ In test after test—in laboratory and in great Flight Research Center, MacArthur Field, Long Island—Sperry flight controls are conforming to prove their capacity to maintain stable all-weather flight in jet, propeller-driven, rotary-wing, lighter-than-air and piston aircraft.

➤ For 40 years Sperry has been working continuously on flight control problems. With this wealth of experience to build on, tomorrow's problems are being met by today's research and engineering.



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## NEWS DIGEST

### Domestic

Gen Hoyt Vandenberg, USAF Chief of Staff, is recovering rapidly from an abdominal operation, but he is able to resume some official activities in a few weeks, say sources close to the general. An Air Force spokesman has stated that Gen. Vandenberg's condition is satisfactory and he can spend a few days at his Ft. Myer, Va., residence soon.

Casino H-46 caught fire and was almost completely destroyed while being loaded at Casanova's Sea Dragon plane. No one was injured. Salvage is expected to reduce the loss to less than \$1.5 million.

William C. (Bibi) Bell died June 14 following a heart attack while at home in Lake Mahanick, N. J. The 58-year-old civilian aviator was a member of the Aviation Writers' Association, was formerly with Flying magazine. For the past few years Bibi served as vice president of Vedicraft, Inc., aviation technical consult publications.

Personal and executive plane shipments during April by six firms totaled 178, dollar value being \$1,144,000.

Robert E. Bell has been appointed head of Boeing Airplane Co.'s sales or promotion, succeeding Frederick B. Collins, who resigned to take a high position with a Seattle corporation. Bell has been a Boeing sales engineer since 1946.

First Goodyear ZPN aircraft was scheduled to arrive at Lakehurst, N. J., Navy lighter-than-air base, last week from its home port, Alamogordo, N. C. Bagley Navy aircraft aircraft, the ZPN in 524 ft long, holds 875,000 cu ft of gas, has two Wright R-1300 engines.

Edgar N. Smith, former special assistant to CAA Administrator Charles E. Feltz, and with CAA since 1944, has been named Regional Administrator for Region 9 (Pacific Islands) with headquarters at Honolulu. He succeeds W. E. Klase, retired.

Severe tests covering more than 100 conditions have been completed on a Northrop F-89 Scorpion at weather facility in the Structures Test Laboratory at Wright Air Development Center, Dayton. Design conditions were tested up to 100% of any load that might be expected during actual conditions were tested to destruction.

Douglas DC-7 power packages will be



TWO SILENT JET BOMBERS have the Hill Airco, which knew the technology between the Soviet and French states of Berlin, going considerably close to a copy of German jets. This accident preceded the recent seizure of two bombers.

built by Rohr Aircraft Corp., Chula Vista, Calif. Initial order is for 132 units, adds several million dollars to Rohr's more than \$132 million backlog.

Airline aircraft in U. S. numbered 14,019 as of Jan. 1, with more than 50,000 single-engine types. There are approximately 1,700 twin-engine planes active, 540 four-engine and 12 tri-engine craft. Airlines operate 1,231 in all, CAA has no record 34,526 in airline airplanes. Figures are reported in new Statistical Study of U. S. Civil Aircraft as of Jan. 1, 1957.

CAA Member Joseph Adams was scheduled to leave Washington last week for a month's official tour of the troubled Middle East. He's due to stop at Seattle this week and north Alaska by the weekend.

Damage suits totaling \$752,000 have been filed in U. S. District Court against TWA and National Airlines. Half million dollar damages are sought by the widow of Conrad Lucas, attorney, killed in the crash of a TWA plane near Casco in August, 1950. NAL is being sued the \$252,000 by the widow of Max L. Field, who died in Feb. 11 crash of an NAL airplane at Elizabeth, N. J.

commentary: The two endangered jets are believed to be an American design, straight winged with swept tails. Wings appear to be placed considerably behind the center of the fuselage. A very noticeable bulge marks the plane's belly.

### Financial

Panavia Helicopter Corp., Moscow, Pa. in 1955 reported sales of \$26,866,572, more than last year's 1954's total. Net income last year was \$139,550. Bookings as of Dec. 31 was \$119 million.

Airlines Operating House, Washington, D. C., reports April backlog of \$38,815,446, a 13.9% increase over 1955.

Teneco Aircraft Corp., Dallas, has declared a regular quarterly dividend of five cents on capital stock, outstanding, payable June 10 to June 20 holders.

### International

Two Russian jet fighters reportedly shot down a Swedish Air Force C-47 over the Baltic Sea June 18 while the latter was searching for a missing Swedish military transport. The crew of seven was rescued.

Vickers Supermarine 585 jets jet aircraft fighter has covered out many operations much slower HMS Eagle. The 585 has two Rolls Royce Avons.

Puglio F-148 has won an Italian Air Force competition for trainers powered by Locomotive engines (Aviation Week June 8, p. 15). Puglio reportedly is building engine under license.



# Remington Rand Methods News

HOW "FACT-POWER" CAN BOOST YOUR PLANT'S OPERATING EFFICIENCY

## Does your COSTING cost you too much?

Cost accounting can be easily entered if your reports are late, inaccurate, inaccurate, or containing too much clerical time in gathering and analysis of data.

Let us show you how one plant, with little extra effort, gets complete distribution of all direct and indirect labor. This method, guaranteed and safe, saves on each job. Their prompt job reports show labor, material, burden, total cost, and the difference between actual and standard costs. Other by-products of their profitable punched-card methods are: correct and accurate report by employee, improved control of materials inventory, better payroll with income averaging. Ask for illustrated case history folder RM-179.



**Costing in smaller plants.** "A year ago," reports an associate, "we thought our plant was too small for punched-card labor distribution. But we were wrong six weeks before the actual cost of parts for the output of our 150 plant employees. So we were glad to learn about Remington Rand, the simplified Remington Rand punched-card method. Now we get labor distribution reports promptly on each production run—with a breakdown for each operation and each part number in the run. Also, by adapting this method to sales analysis, we get prompt reports on our built-to-stock LCL shipping costs."

See for yourself how simple this low-cost Remington Rand method can be applied to small to medium plants. Ask for a slide film demonstration in your office, as well as folder TM-693.

Look for ideas from the **Remington Rand Management Controls Reference Library**



**Goodly to brass tool check!** "For years," reports a foreman, "we had trouble with old toolroom issues that checked. They would get knocked off their hooks and mixed up. On the hard ground would return a check with wrong employee number on it. Now we have a Remington Rand visible system which double-checks tool to prevent error. Each tool center can keep its records easily and accurately, relieving General Store of the paperwork. What's more, this toolroom system guards against a shortage or overstock on any tool." Let us show you simple methods of tool tool control to reduce your tool costs and save the valuable time of both productive and non-productive employees. Ask for folder KD-541.

## Tackling the problem of payroll peaks

There are five ways to know which has the most effect on payroll cost and cost to pay. To do this, they spent year developing better procedures and a smoother work flow.

During this careful study, Remington Rand payroll machines were chosen to replace others previously used. This and the machine features which greatly increased the choice were: 1) constant visibility of the working line in a plant and in general; 2) ability to get all the data on each employee's record on each payroll; 3) variable printing out of all data for different sections; 4) simple logical simplicity which enabled them to make complete operation quickly and of reports without long and costly special-handling.

Let us show you more reasons why Remington Rand machines produce data or check payroll faster. Ask for folders AD-445 and AD-325.

## 20% slash in costs for plant upkeep

According to NY Times, a top industrial consultant says that proper planning and scheduling of preventive maintenance work may lead to savings as much as 20 percent on your overall costs for plant upkeep. If this kind of tool takes you want to save more, let us show you how we have helped many plants reduce costly machine breakdowns as well as lower their costs.

Make a brief but profitable study of the preventive maintenance records and procedures used by ten well-known industrial firms. Ask for a ten day loan of our new history file MC-722, and for your copy of our folder KD-705.

*For information, please request literature by card or call our Business Equipment Center or your office, or write to our Management Controls Reference Library, Room 1162, 325 Park Avenue, New York 10, N. Y.*

## WHO'S WHERE

### In the Front Office

**T. R. (Red) Smith** has been named vice president of Aero Design & Engineering Co., Tulsa, Okla., Oklahoma City. He will continue to hold his previous responsibilities as general manager of the firm.

**Robert D. Kasey** has been designated as vice president of Pacific Northwest Airlines. Kasey served as CAA's director of Alaska since late 1953, when he resigned to accept private business.

**T. R. Gushka** has been appointed assistant to the president of American Engineering Corp., Watville, N. Y., which develops and produces electronic aircraft instruments and controls.

**Howard J. Korth**, president of American Air Export & Import Co. (Inc.) has been named temporary president of the Independent Air Transport Assn., following resignation of previous president, **C. Ray Chalk** of Trans Caribbean Airways. Chalk continues as a member of IATA's board.

### Changes

**R. E. Arnold** has been named assistant to the manager of Westinghouse Electric Corp.'s Aviation Dept. Tullahoma, Tenn. He is a former executive of Pratt & Whitney.

**A. R. Milward** has been named controller of operations for British Overseas Airways Corp., directly responsible to BWG's chief executive, Peter Maxwell.

**F. T. Soper** has been designated director of industrial relations for all branches of Pacific Airlines Corp. He will have his headquarters in Portland, Ore.

**Robert E. Baker**, formerly a consultant for Hughes Aircraft Co., succeeds R. Paul Peters, resigned as general manager of Cessna Aircraft Co., Inc., Waukegan, N. J.

**Don Colburn** has been made administrative director of the North American branch of the Alouette Helicopters, Inc., according to the Montreal Pilot who is returning to Montreal.

### What They're Doing

**Dr. Linn Cronin**, R. E. Goshall, president of the Council and Business Consultants for Population Control, Princeton University, has been appointed to the advisory board of Boeing, Wichita, Kan., by the N. Y. State Council.

**Frank Casco**, who recently resigned a top management post with Glenn L. Martin Co., has established himself as a consultant to the aircraft industry and national aircraft work. Offers are at 1130 Court Street, Suite 1100, Springfield, Mass. Phone a Plaza 7130.

### Honors and Elections

**Oren M. Nelson**, president of Tascocom Air Lines has been awarded as Honorary degree of doctor of science by Southern College, Louisville, Ind. "for his leadership in pioneering a new concept in transportation."

**Robert L. Shull**, former president of Cessna Aircraft Co. of N. Y. and a past vice of Sanderson & Potts has been elected a director of The American World Airways.

## INDUSTRY OBSERVER

**Vulcan-Aeromarine, Ltd.** now has 54 orders for Vulcan helicopter transporters. Australia National 6, Air Lines 4, Air France 12 and BEA 16. Company will have capacity to turn out four to six Vulcans a month by the end of 1953. First production model will be delivered to BEA next October.

**De Havilland** has the new five orders for Comets, making a total of 78. Recent additions haven't been announced, but it is a good bet the buyers are Australians.

**Despite some military and industry shakiness** to the contrary, USAF's Office of Flying Safety reports the C-54 has one of the lowest accident rates attributed by any single type since the bomber made its first flight in 1946. This record is even more significant when it is recalled that it was and is the heaviest operational plane built, and that it tests new procedures without the usual months of flight evaluation and testing. C-54 scores.

**Effects of heat on nylon webbing** are beginning to be of considerable concern to the Air Force as speeds near supersonic range. Weapons Components div., Wright Air Development Center, reports that nylon will turn yellow after exposure to 300 F. for 5 hrs. will melt at 470 F. and will blow at 557 F. When heated for 30 min. at 300 F., it lost 50% of its strength.

**Wright R1508 engine**, rated at 800 hp, is being promoted as the powerplant in a new variant of the Sikorski HO4S Air Force helicopter, which was over the 600 hp Pratt & Whitney R1190 engine. The 7-cylinder Wright engine now has a record of more than 115,000 flight hrs. in two years of military operations in North American T-48 trainers.

**New military requirements for turboprop engine preliminary flight testing** will have more emphasis on demonstration of engine safety for flight, rather than the usual extensive demonstration, at manufacturers' cost of U.S. manufacturers to the military are followed.

**Small boom in small plane civil order estimates**, with both Cessna and Piper shipping up production schedules of their development to take care of increased orders.

**McCulloch Corp.** plans to get its first MC-4C production and helicopter completed in July from its staged safety and civil production. Navy gets first two in June, Army gets one in July, two in August.

**CAR** has decided that the Rotax machine engine is no longer necessary and has deleted it from CAR Part 2 (June 15 revision). Decision is based on the fact that around CAR Part 18 permits a manufacturer to rebuild or alter products for which he holds a type or production certificate as which are manufactured by him under specifications approved by CAA, so that the cost factory machine is no longer needed.

**There is industry speculation** that the Beech Aircraft entry in the forthcoming jet market TX cooperation will resemble more than a little the two-part executive jet aircraft described by Beech design engineer R. M. Phoenix in a recent ASA paper at Washington, D. C. (Aviation Week Mass. 24, p. 14).

**Nearly disclosed** now for the widely distributed Pratt & Whitney R2300 engine, rated at 2,400 hp, will be the new Sikorski S-56 turbine helicopter, on order for the Marine in the HUS. This means the S-56 will have more power than any U. S. piston engine helicopter yet disclosed. Its current competition the big Air Force Sikorski HO4S, rated with new P-W R2140 engine rated at 1,550 hp, which is the S-56, nearest Sikorski appears to be a tandem rotor, is being eyed with interest as a future replacement for the HO4S.







steered through the House without his participation.

On the Senate side, Johnson is making up to see what the House does before introducing action by his committee.

• But there's even less hope that money for the program will get through that session of Congress—or any session in the foreseeable future. And the airlines continue to insist on adding without the money to implement it. House Appropriations Subcommittee on Commerce Department, headed by Rep. John Rosten, is joined with an R in not off funds for "subsidy to the airlines" and a pass any program to benefit the airlines exclusively in this category.

With Budget Revenues opposed to the program, funds for it won't be in question of Congress. And, if it is, the House Appropriations Committee will not volunteer them. Senate Appropriations Committee, more leniently in civil aviation development, can't originate appropriations.

• How This Stand-Turnout before the House Commerce Committee devalued basic points.

• Defense Department is opposed to the program, although its position was decisively stated by Brig. Gen. Gabriel Dwyer, USAF's director of training. It is understood that USAF took a friendly position toward the program, but that Navy turned thumbs down.

• Labor Department wants to make sure the apprenticeship method, under an apprentice program—instead of by private schools. Director of Labor's Bureau of Apprenticeship, William Peterson, overruled the fact that neither the airlines nor aircraft plants have the facilities and staffs to train A & T mechanics and pilots.

• Civil Defense Administration, with a vital interest in bolstering the air potential for evacuation, data is better to support the program in view of Administration's opposition and Congress' refusal to show money for civil defense purposes.

• Civil Aeronautics Administration couldn't give "official" support to the airline's training program but CAA Administrator Charles "Pete" Smith "agreed its cooperation."

Other witnesses who strongly urged enactment included Joseph Goetting, representing Aircraft Industries Association; Stuart Tipton, representing AIAA; Mitchell Ballou, President, Aeronautical Training Society; J. L. O'Hara, executive director, Airlines Personnel Relations Conference; John Griffin, vice president, National Aeronautics Association; Dallas Rostin, former Undersecretary of Commerce for Transportation, now vice president of Cessna Aircraft Co.; Lester Jolly, secretary, and Harold Voss, director, of the North Dakota Aeronautics Commission. —EJ

## Newark Field Gets Second Chance

Big eastern base open to traffic, but restrictions cause airlines to act cautiously in using field.

Port of New York Authority opened controversial Newark Airport to the airlines on a limited basis beginning June 16 after approximately a five-month shutdown, but for the first few days the only activity consisted of landings by private planes and home-coming flights performed by ground staff.

There was good reason to believe that Newark, formerly one of the world's busiest terminals, would not again become a major base in the East until opening of its new instrument runway, scheduled for early November.

Severely restricted operations were the major reason for serious apathy of the airlines, scheduled and unscheduled former tenants. It also appeared that the carrier may have been caught with their plan down.

• Work and See—The majority of airlines which operated on early start operations at Newark believed that the present rules made any thought of large-scale operations at the field impractical, but, they said, "we had to get the field steadily open and operate even a few flights to give us a chance to get back in the good graces of the nearby residents. We'll see what happens now."

Presiding exception of the instrument runway, these were the rules established by PNTA as recommended by the National Air Transport Co-ordinating Committee.

• No landing on Runway 28 toward Elizabeth or on 28 toward Newark.  
• No landing on Runway 6 from the direction of Elizabeth.

• Operations permitted day and night, but only when surface and visibility minimums are 1,000 ft and three miles.

In addition CAA has laid down the following runway priority system: Takeoffs Priority 1, Runway 20, Priority 2, Runway 6, Landings Priority 1, Runway 28 Priority 2, Runway 24 Priority 3, Runway 10. These priorities will be reversed when the new instrument Runway 422 opens, with preference schedule listed as:

• Takeoffs Priority 1, to the north on Runway 22, Priority 2, to the east on Runway 18, Priority 3, to the west on Runway 24, Priority 4, to the east on Runway 20.  
• Landings Priority 1, from the north on Runway 28, Priority 2, from the east on Runway 22, Priority 3, from the north on Runway 22 and Priority 4, from the west on Runway 18. Although Runway 10 is open, it is at present in holding from the direction

of Newark, on low-power, rising as soon as low ceilings.

With Runway 28-10 not for landings from the direction of Elizabeth or toward that city, Newark is left without an instrument runway until the new strip opens in November, thus the surface and visibility rules now in effect. And CAA has given no record in saying it will strictly enforce them and cite any violations.

• May Ask Inspection—Although a seven-hourly inspection operation level recommending landings had written PNTA that it would seek an inspection should the Authority approve the airport's reopening, there was no action along these lines until last week.

An early check of the airport canopy indicated that the total Newark schedule probably will not get above 50% of the approximately 160 more flights scheduled north before the port was closed, until the new instrument runway opens. For the most part they were busy studying weather records in an attempt to calculate what schedule they could forecast under the restrictions before called. Many, particularly the freight carriers, were not anxious to set up duplicate facilities in case they couldn't use Newark when the weather killed operations.

Although some still believe Newark is the best locale for conducting freight operations because of its closeness to a large industrial area, others were angry with the north 31 million cargo facilities set up by PNTA at Newark. Should some of the freighters at Newark decide to leave, it might be that this field could supplant Newark as an important segment of the instrument operating out of Teterboro and they would like to get back to Newark.

In the meantime, Port of New York Authority is working at an improvement program for the 6,000-foot instrument runway. Run 50 now has settled

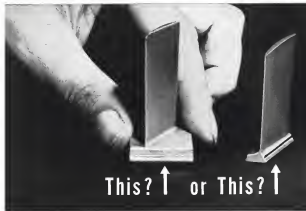
## Civil Domain

### Output Assured

Dorin Helicopters, Inc., Danbury, Conn., now is in a position to take commercial orders for counterparts of the YH-119 rotor in use by the Army.

The company's commercial schedule has been made part of CAA's C-7 production program for civil aircraft, which assumes that Dorin can take delivery of necessary materials to make the complete craft.

# Which One Will Save a Million Dollars?



Three years in the making, the fabricated jet engine compressor stator blade (left) promises to save the aircraft owner at just one million, but millions of dollars annually in jet engine costs, compared with the forged blade (right). This new G.E. development will cut manufacturing cost on both and save over a third in engine maintenance. Military approval has been received for the use of fabricated blades in the General Electric J47 G-2 which powers the Boeing B-47 Strategic bomber. And G.E., through the United States Air Force, is sharing the process with other foreign manufacturers.

The blades are rolled in long strips, contoured to the proper air foil, and cut to desired length. Each blade is then welded into a separate base which fits the engine

core on the "blade ring," and with forged blades. Thus the rig and an expensive manufacturing and assembly process have been eliminated.

Rendence tests on two engines equipped with the fabricated blades proved them just as efficient as forged blades. The base provides greater resistance to vibration due to uneven airflow through the compressor. Damage caused by foreign objects entering the compressor is minimized because the new blades are laminated much more strongly to the casing.

A product of G.E. research at the Thomson Laboratory in Lynn, Mass., this new method of manufacturing stator blades is another of the many ways in which G.E.'s constant pioneering contributes to the advancement of aviation. General Electric, Schenectady 5, N.Y.

You can put your confidence in...

**GENERAL ELECTRIC**



## Executive Transportation at its Finest!

The De Havilland "Dove" has proven itself to be the "top liner" in its class. It has grown to proud owners (almost 500 of them) many hundreds of thousands of miles of safe, low-cost, comfortable transportation service. No other airplane can boast of so many fine features which add to the comfort, safety, ease of operation and overall performance, both on the ground and in the air as the "Dove".

Gordon Air Service is a franchised regional distributor of the "Dove", and has had direct working experience with the aircraft since 1948. Therefore we can guarantee that the "Dove" will

deliver top performance air-mile, after air-mile, after air-mile.

A good supply of replacement parts and accessories are carried in stock, and expert maintenance service is available at Pontiac Municipal Airport, Pontiac, Michigan — and all well equipped airports.

Factory-trained De Havilland service representatives on call as a convenient feature.

The handy location of De Havilland Aircraft Co., Ltd., Toronto, Canada, (just across the border, as the "Dove" flies) means an ample supply of parts and equipment readily available.

### Here are a few of the "Dove's" fine features:

- Low operating cost
- Low noise level
- Low maintenance cost
- Triple landing gear
- Hydraulic full-authority propellers
- 180 mph true cruising speed, at 80% power
- Automatic least control
- 1600 mile still-air range

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# AERONAUTICAL ENGINEERING



SUBSONIC TUNNEL at the Forrester Center is investigating boundary layer control on models shaped from a typical rotor blade.



ROTOR ROTOR system on test in this wind facility providing control of rotor assembly in vertical and horizontal view.

## Forrester Center to Study Fundamentals

Research hub will delve intensively into studies of flow, aeronautical engineering and flight problems.

By David A. Anderson

Pontiac, N. J.—Basic studies in flow sciences and aeronautical engineering top the program list at the James Forrester Research Center of Princeton University, which was dedicated here recently.

The broadest concept of the Center deals as well as the advance-

ment of science and engineering and the high-level training of workers in these fields.

Within that framework the four major efforts in aeronautics and a foundation of extensive research contribution in the fields of theoretical work, fluid mechanics and combustion. The related effort going toward these subjects encompasses the current in-

portance of flight problems in the near all scientific advance.

• **Progress Report**—The Center comprises 500 acres of land and the laboratory buildings which were former property of the Rockwell-Rohrbaugh Co. • **Medical Research**—In the 18 months since the first announcement of the establishment of the Center at Princeton, four lines of endeavor have been pursued.

• **Convenience and development of the laboratory buildings.** • **Organization of the first group of**

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Lockheed developed this two-place jet trainer from America's first jet fighter, the battle tested Lockheed P-40 Fighting Hawk, proven for reliability in Korea.

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### SUPER CONSTELLATIONS TO GET TURBO-PROPS

The U. S. Navy has selected the new B70-1 Super Constellation as ideally designed for vital conversions to turbo-prop power. Only minimum modifications are required, according to Baker. No structural changes of the empennage, fuselage or basic wing are necessary.

Significance to airline operators is that Super Constellations with Wright 3520 h.p. compound engines can later be converted to turbo-props. This conversion to Pratt & Whitney T34 Turbo Prop engines will put the Super Constellation in the 450 seat-price class.

The Super Constellation offers any airline operator top performance by design, from high-altitude cruise travel, to heavy coast-once travel, or it can be used for efficient, economical cargo purposes.

Never before has the basic structure of any aircraft provided so adequately for growth, covering the separate many years of competitive performance. Compared with any of today's certified aircraft the new Super Constellation is superior in versatility, speed, payload, range and ability to earn greater profit.

#### NEWS NOTES FROM LOCKHEED

Eight successful missions have been flown by Super Constellations from Seattle, Lockheed's Western Airline and Seattle on S.A.L. & Co. transport. With Navy and Air Force orders, the new aircraft are expected 200—4 are "Wing House" numbers at Lockheed P-40 Fighter Jet Engines is pending Washington, D.C. Lockheed is working with several airlines on different kinds of routes, including long-range, high-altitude, and low-altitude. For this conflict, the new Lockheed jet fighter has outlasted conventional engines requiring a 100-hourly maintenance. The single Allison jet engine in the Lockheed T-38 jet trainer is more powerful than all last engines of the B-17 bomber of World War II type. Pilots of many nations are jet flying in Lockheed T-38 trainers, and recently when two T-38s were delivered to Turkey they were equipped in flight with maintenance also including a lock-out.

#### FROM THE WORLD PRESS

Under the headline, "New Facts on Jet Carrier," Aviation Post reports from Tokyo: "The Lockheed T-38 (Fighting Hawk) still is considered to be the best general-purpose jet in Korea. There is considerable belief here that development of an airplane along the present lines of the P-40 is the answer to the immediate combat support requirement." This earlier Lockheed design continues to prove its basic "simplicity" even though new models (from here) are required in Lockheed's jet carrier line.

enough project by the Research Center

• **Reduction of research activities**  
• **Exploration of the Center's potential** for the advancement of science.

First operational task completed was the programming of four research projects in the flow science—fluid mechanics, combustion, chemical kinetics, thermodynamics and applied mathematical sciences.

Now being added to this first task, is a complete one for the solid state sciences—chemistry, metallurgy and physics. Plans also have been made for studies in machine sciences, completing a well-rounded program of fundamental investigations.

In the engineering science sciences, jet propulsion and chemistry programs share the scientific spotlight, with electrical engineering soon to crowd in.

• **Aeronautical Engineering**—Although Princeton applies rather the distinction between science and engineering in developing its programs, certain phenomena of both come under the Department of Aeronautical Engineering headed by Professor Courant Peckham. Perhaps the best way to describe the aerospace program is to state its purpose: to train and consider the whole field of aviation.

There are four major research areas in the Princeton Center's aerospace effort.

• **Supersonic flow**, presently in the phenomena of Reynolds number effects and shock-wave and boundary layer interaction.

• **Jet propulsion**, with effort divided between the ducted rocket and solid rocket instability.

• **Flight research**, by boundary-layer control and stabilization systems.  
• **Hydrodynamics**, particularly control and stability studies with correlation between theory, model tests and full-scale flight tests.

Currently this work is located at both the Princeton campus and the Pierson Center, they normally should not the entire program moved to the Research Center.

Much of the work is jet propulsion is represented directly or indirectly by the Chaswell and Pierson Center's Jet Propulsion Center. The facilities of the Gasdynamics Center are located in the Pierson Center, and administration of the jet propulsion program is one of the functions of the latter body.

• **Supersonic Flow**—The main field of effort in supersonic aerodynamics often involves the changes in flow patterns with Reynolds number. These flow changes—caused by variations in viscosity and viscosity which are conveniently correlated as the Reynolds number parameter—have been considered to be the largest single remaining obstacle

in the way of understanding supersonic flow.

The attack on this problem has been two pronged, by theoretical studies and supporting tests in the Center's wind-tunnels. These studies are those in which two are supersonic flow with a static model for the effect, but has since been converted into an equally exact test (and one is hypersonic). These studies advance in the high-temperature pressure available, which means that the range of test Reynolds numbers can be very large. The tunnels are all blowdown types, and blowdown goes to atmospheric pressure. Storage air is at 1,300 psi jet velocity changes, tests.

• **Tests of the Trade-Types of the irregularity** with which the Princeton staff has approached many of its problems is the structure of the large supersonic wind-tunnel. Manufacture of large steel tubing on the order of two-foot diameter just couldn't deliver tubing that would stand high pressure at this velocity range.

One of the Princeton faculty, working his mind to devise the high-strength tubing thought of long-cylinder metal tubes. After a lot of correspondence, the Naval Gas Factory came through with a section of the length of a 16-in. tube which was large enough—and more than strong enough—for the supersonic wind-tunnel.

Another simple solution to a complex problem came from the high noise level in the operation of the tunnels. Various kinds of jet protection have been developed, but the heavy wind-tunnel and combustion facilities through out the country. But the Princeton group found its best solution in the modification of standard Navy rocket motors.

Normally these jets have a nozzle on a shield of non-rubber, to be added additional sheet have rubber padding and a loop ring which fits tightly around the nozzle and encloses the jet. These hose-mold jet attachments the noise from the tunnel has been a tremendous level.

An interesting development in the program is the use of nylon in the new material for wind-tunnel models. Nylon for models has several advantages. It wears better in the shock-tubes than other steel or brass; it is easier to handle and work, which means cheaper models. Nylon has lower heat capacity than steel—it doesn't heat up so rapidly during tests and therefore takes less time to cool, making the run time between tests.

• **Propulsion Studies**—The Princeton Center is headquarters for Project Sigurd, a university-based fundamental program in high-performance combustion. Advancements in the study of the research efforts of 16 sub-center



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blastburn is contained here.

Pratt & Whitney's contribution to Project Squad takes the form of two studies. The first is concerned with solutions between turbulence and combustion in high-speed flow. The second deals with mixing of stable flow-turbulent and supersonic such as are found in ejectors or the ducted rocket.

The ducted rocket is a powerplant of great promise for certain classes of supersonic aircraft. It is a combination of the jet and rocket modes in which the rocket is placed inside the jet. The rocket function is an ejector for the low-speed range of operation and also serves as a flameholder for the jet. The rocket motor typically blocks off about 10% of the jet's cross-sectional area.

New test facilities for rocket motor studies have recently been completed and are about to be equipped and concentrated. Rocket motor tests will take place in two test houses which share a common control room between them. All instrumentation is remotely read and recorded in a building located nearby.

► **Flight Research**—Eighty acres of pasture land had been converted to a flight strip adjacent to the Langley Center. There are currently two Navaho-class North American and one Ryan—being used in the flight research program.

The completion of a center-block hangar—now about half done—will permit the Center to house a larger number of aircraft types. In the offing are a Navy-operated Beech and a helicopter which with the two Navahos, will represent a versatile and economical fleet of test planes.

When the Center's boundary-layer control program has completed its three- and two-dimensional tests, flight test work will be done at the airport on one of the Center's aircraft.

Another continuing and important one of the flight program is the testing of Air Force engineering test plans in cooperation with the Air Force Institute of Technology. The service personnel have the chance to combine the theory and practice of testing; in addition, they get intensive sponsorship training in the classroom.

► **Rotary-Wing Craft**—Another planned use for the flight research facility will be full-scale tests on helicopters. The Center's program for rotary-wing craft now considers theory and model tests and the only remaining step in flight tests of the large craft. With these three phases of the program completed, the Center will have valuable information for researching these basic attacks on helicopter problems.

The model test facility for helicopters is a different approach than used by most researchers in the subject. Instead of a complete dynamic sim-



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## Fastener Problem of the Month

Helicopter Door Handles

June 1932



**PROBLEM:** Schweizer Aircraft Corporation, builders of Bell 430H helicopter cockpits, previously used a conventional screw to attach an aluminum door handle to a steel latch shaft. costly counter-sinking and tapping operations were necessary. In addition, accelerated tolerances resulted in an undesirable degree of "play" in the handles. As a result, Schweizer engineers sought a more satisfactory and economical fastening method.

### SOLUTION: Self-locking ESNA

Rollpins proved to be the fasteners that Schweizer required. Rollpins are pressed-fit, slotted tubular steel pins with chamfered ends. Installation is quick and easy—they are simply driven into holes drilled to normal production tolerances. No extra operations are required. Rollpins hold fast—vibration-proof—because of the constant tension they exert against the hole walls. They are readily reinserted when necessary — and reusable. Schweizer reports that the use of Rollpins on this application has cut assembly costs, and provided a more secure attachment, with handles "play" eliminated.

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for model, the Center's helicopter group is trying to learn about the rotor system.

For this they have built a rotor head with the features of the Bell design—seven rotor, stabilizing bar—in a short 2-ft diameter. The head is driven by an electric motor; the assembly is mounted in a yoke which is supported on a column and braced structure. The whole works is free to roll along a pair of accurately aligned rails. Thus there is restraint to the vertical axis and no rear horizontal direction.

Control and instrumentation equipment is in a glass-fronted booth which faces the rotor.

**Other Programs**—There are other basic programs, not under the supervision of the department of aeronautical engineering, which will contribute to the general advancement of the aeronautical sciences.

In metallurgy, for example, Princeton and the Ford-Center are developing an attack on the behavior of metals under extreme stress, regardless of the phenomenon causing that stress. The objectives of this program is to get engine development into large and specific areas.

Applied mathematical research and the computation center will provide some of the answers in the complex analysis of flow problems. General kinetics research field where the Ford-Center staff must equal contributions in the field of rocket engine combustion and fuels.

At least one of the staff working in the development of nuclear aircraft—Paul L. Suter, who presented a report paper on extraplanetary travel between orbiting orbits—has considered the application of nuclear energy to jet propulsion, specifically to the rocket motor.

**Defense Projects**—Bulk of the work at the Ford-Center comes from high-priority programs designated by various government agencies. During the academic year which starts this fall, the Ford-Center will probably perform work on more than \$14-million worth of such projects.

Although these studies are geared to the present national emergency, the Ford-Center staff has selected its fields of endeavor so that the results could continue to give value to industry and knowledge as peace. In this the Center has the backing of the sponsoring agencies: the Air Research and Development Command, Navy Bureau of Aeronautics, Office of Naval Research and Atomic Energy Commission.

These agencies and the staff have inaugurated the broad concept of the Ford-Center Research Center to advance the basic sciences and to apply these advances to the theories of engineering.

## On the Piasecki "HUP"

Attached to search coils, Piasecki helicopters have been used in laboratory and field tests, ready to receive control signals forced into the air.



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In an era of supersonic jet speeds, the relatively slow-moving but ever-ready helicopter has captured the imagination with its sensational rescue and evacuation of casualties in Korea.

Paving the way for rapid advances being made in design and utility of rotary-winged aircraft is the new tandem-rotor Piasecki helicopter. On the Piasecki "HUP", as on so many other types of planes, reliable Wickwire Aircraft Control

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**AIRPHIBIAN** automobile conversion controls control motor to rotate pulley through drive pulley action to drive cable to place rotorbody



**H-13D ROTOR HUB** shows standard Bell design of rotor blades and its hubbing bar on U. S. Army's newly conversion rotor



**TAIL ROTOR** of the Bell H-13D is made of tubing and surface. Rotor shaft is simply supported above bearings of tail fuselage assembly for ease of maintenance is outstanding. Note that for protecting anti-torque rotor in event of tail striking ground.



**DIVE BRAKES** for Douglas F4D-2 Skyhawk are operated by long travel hydraulic cylinders. Located on fuselage and vertical tail, these brakes serve for drag control during approach as well as down. Note how complex cases through for identification when brakes are opened.

## Things You May Have Missed at SAE Show

About a score of America's military and civil planes and copters were lined up for closeup inspection at N. Y. International Airport (Jeterfield) during the recent air display sponsored by the Society of Automotive Engineers at its National Aeronautics Meeting.

Closeup in the right word—everywhere there were people bent over to look at the underbody of a fighter, squatting under the wheel well, standing on tiptoe to peer into a jet tailpipe.

But often in displays of this type, visitors come away

with the feeling that they haven't seen the trees for the forest.

These photos taken for AVIATION WEEK point up some of the features that may have been missed: the unique vertical way that Falcon transmits control forces from the automobile hull to the airplane hull of an Airphibian; the ease of tubing and surfaces at the tail of Bell's functional copter, the H-13D; the new look in external prepackaged thing under the wing of the big Douglas Skyhawk, among others—DAA.



**POWERPLANT** of Ag 1 sports turbo in Continental 3-215 mounted for low speed for possible future replacement with larger engine. Turbine exhaust ducts are normal ducts on Turbomec engines.



**SIKORSKY YH-18** is one of most recent Army Field Force acquisition. Rotor details are characteristic of flying blade system but appear to have been simplified over earlier Sikorsky models.



**NEW PACKAGE** in external stores is the elongated "beak" shape along under the standard wing of the Douglas F4D-2 Skyhawk. Douglas developed the front in order to carry fuel to instrument externally on jet fighters without a large penalty of increased drag.



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# Valve Talk

for WM. R. WHITTAKER CO., Ltd.

by Morris Miles,  
Senior Member, Aviation Writers Assn.



As he talked, the firm, grey-haired Scot sketched valve mechanisms on a scratch pad. It was spontaneous doodling, typical of Don McLean's absorption with the challenges of engineering intricacy.

Executive vice-president of the Wm. R. Whittaker Co., Ltd., and a private pilot when he has the time, Don directs the multi-faceted operations of the Southern California valve concern, with quiet insistence on original thinking.

"We are in a fast-moving business of recoupled products engineered for an advance of other concerns," he said. "It's a day today fight to stay ahead of changing attitudes and power plant designs."

That, the son of a farm-laborer-mechanic, has spent most of his 33 years in mechanics. He started at 14 when he took over his brother's garage during World War I. An engineering major, he says, from shops and engineering, Don practices what he preaches, venturing most often in his home machine shop.

Don's specialty—nomans and orators—played a large part in acquiring the Whittaker Company into a \$10,000,000 building here now. He first worked with Bob Whittaker as a consulting engineer. It was his design of a valve mechanism for the original Whittaker (R-20) valve that explained his add-on to advanced and modern operation that of valves.

Both Whittaker and McLean no longer see the importance of designing valves and their concern as integrated units. From this realization spring Don's affiliation with the company. Whittaker's entry into the motor aviation field and development of the revolutionary motor-operated gate valve that completely changed military thinking in respect to fuel control equipment.

"Today we have three new operations at Whittaker," Don explains. "We produce the standard valves no longer built five years, two but our newly designed valves and work on designs for the future."

Standard valves are produced by turning the crank, as to break new valves bring tough problems of modification and manual changes. But the development designs are the real headache.

"We must follow all progress developments so we can check our effects in

the most vital direction. We've got to be relevant for there is a danger of Don so much like a year and from \$150,000 to \$100,000 involved in pilot production time alone."

"Test based equipment involves costly changes (usually made before we know a valve will go into quantity production). This calls for constant devices, since we ultimately can't run a jet engine day in and day out in design, performance under critical flow, temperature and pressure conditions."

"Manufacturing a single two pound valve unit calls for a multitude of operations and the integration of some 180 parts. Frequently the process requires our own development of expensive special manufacturing equipment."

"We are usually asked to do 150 percent of what we can do and we always try to meet that extra 10 percent. Sometimes we fail of course. It is a battle of compromise to build dependably and safely into light-weight products. There are changes, modifications, new ideas and when a valve is ready for production it looks something like the original conception."

"By the time our program reaches production new designs are in the drawing boards, under development at a fast factory new ideas are being being conceived. We never catch up with ourselves."

Aircraft valves, Don says, are steadily growing more and more complex. In engine units (some 25 percent of Whittaker's business) and particularly turbine valves are adding a multitude of ridges in metallurgy and tolerances.

"It's an engineer's day," he still best remembered, "and Whittaker recognizes it. One out of every five of our people is an engineer—and these 150 men deserve plenty of credit."



Design for a jet transport.

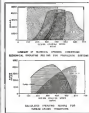
## Canada Lab Analyzes Jet Transports

Aerodynamics Laboratory of Canada's National Aeronautics Establishment has come up with an interesting study of jet transports.

Results of an investigation recently conducted at the laboratory show an optimum design configuration for a specified cruising speed of 550 mph with four turbojets each delivering 6,500 lb net lift static thrust. And casually enough this design layout resembles the de Havilland Comet.

► **No Options**—No single powerplant will emerge as the answer to every thing, says the NAE study. And to back this up a graph of range is plotted against speed and marked with series of recommended operation for piston engines, turbojets, and turbofans. These three regions overlap to a large degree, indicative of the lack of pronounced advantages which exist.

NAE made an investigation of both types of gas turbine powerplants; it was shown that 400 mph is about the top cruising speed for the turbojet.



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**ON THE STEP** Martin M-270 research craft cuts across the water of Chesapeake Bay. Plane is being used for development of high length-beam ratio hull, was modified from original experimental XF3M-1.



**ON THE GROUND** new hull lines of Martin M-270 give stiffer look to original stubby lines of XF3M, extend hull steps, flatten Vee bottom of fuselage and flare out stubby wings.

## M-270 Hull Reduces Flying Boat Drag



UNCONVENTIONAL outline for a flying boat is shown in this view of the Martin M-270.

Next step for shock flying boat hull—a length-beam ratio of 15—is being modeled by the Glenn L. Martin Co.'s M-270 research craft.

Now in flight and test runs in the Chesapeake Bay area near Martin's plant, the M-270 is the full-scale embodiment of unusual and test-tested models of the past several years.

Designs of the new underbody on the M-270 was the responsibility of Martin's hydrodynamic group under J. D. Person, working closely with engineers at Navy Bureau of Aeronautics, Naval Advisory Committee for Aeronautics and Stevens Institute of Technology.

**■ Why Higher Ratios?**—The principal reason for the increased length-beam ratio on a flying boat hull is to cut down the resistive drag.

Hydrodynamic efficiency is little affected by the comparative dimensions of length and beam of a hull. But as the length-beam ratio increases, all three hull drag parameters—concealment, wet, viscous and wetted area—

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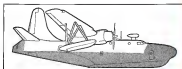


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NEW PARTS built into Martin XP5M-1 are shown in this shaded drawing of M-270. Six fast have been added to nose and to half of all outer line.



TWIN LANK MACHINERY, the M-270 half shown through the tank at Stevens Institute of Technology. Black lines on model have been reproduced on full scale engine in white, serve to provide qualitatively test data of cast.

designer. That is why high ratios of length bore ratio are desired.

Half weight figures in low, too. The structural problems in designing a shaft, for full are considerably different from those in designing a long, thin body.

Standards have been made which set an optimum value of the length bore ratio, considering all possible factors of aerodynamics, structure, weight and hydrodynamics. Martin says that the 13-to-1 value is the optimum for flying test hulls.

► Concerns—Tank tests in the Stevens testing tank followed the studies of new hull shapes. The final step was translation of model studies to the full scale M-270.

The M-270 is really the first experimental XP5M-1 flying boat (which like Ed's Fatalist Poisson, which is mostly a German XP5M-1) which was flown August 21, 1952, p. 481, only the underbody and the low speed features it carried are new.

Construction of the XP5M was expedited by the system of economy and firm. Wing, engine and equipment were already proven components. Cost of getting the M-270 into service was less than \$4 million, a relatively low figure by today's standards.

► Background—There's an interesting bit of history behind the party which went ahead for the M-270. They're in their second incarnation. It happened like this:

The wings and hull cross-sections were taken from the experimental XP5M-1. But when the XP5M-1 first came out of the Martin shop, she was a composite of new and old parts. The same wing and room sections had been part of an earlier Martin F8M Mustang, with some leaf up in the wing structure to handle the new Wright R1310 engines which replaced the F8W R1300 engines of the Mustang.

When Martin went into production

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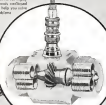
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on the FSM Market series, the need for the experimental "dog" ship ceased and it became available for the land development program.

• **New Year's Child**—Preliminary lines had been completed and engineering designs started at the beginning of 1951. By the time March had arrived, the XF5M was back in the Martin shops leaving her both heavier.

Prudent consideration in the alteration was that the outside skin be smooth, firm weight and lateral contour were subjected to a secondary system. New hull frames were built and attached to the stumps of the old ones with tongue lapped and riveted joints.

The nose of the X Macho was not so that it could be modified over the additional six feet of fuselage length. And the airbrake was also positioned as far as a simple extension of the bell behind the line of the cinder.

Then keger ball line altered the loads on the crown section somewhat so that the forward crown section had to be strengthened a little.

Anchor latches, well above the waterline of the KPM, had to be relocated because they would have been below the waterline of the M270 hull. No changes were required in wing, tail or tip floats, only minor relocation of pulley brackets were required because of local structure changes.

Fuel tanks in the tail were removed because the M-270 will not be required to fly for long times. Only the wing fuel cells remain now.

► **Test Techniques**—The network of whole lines on the hull of the M-270 corresponds to the same network on hull models used in towing tests. Thus, correlation between model and full-scale data will be possible.

Master plans two techniques for on-the-water use. The M270 will be paired by a motor launch in one of these techniques for photography of the spray pattern. In the second, the M270 will make passes at a stationary boat for the same purpose.

No performance of the new research boat has been released yet, but Martin does say that the new hull is showing better water stability and takeoff characteristics than the PIM boats. Martin engineers expect that the increased length and changed shape of the nose will greatly reduce the small amount of spray which new jets pump and thus of the Martin.

Basic weight of the M279 is 64,000 lb. In overloaded condition this figure is 71,000 lb. Two tests will be carried out at weights running as high as 85,000 lb.

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## THRUST & DRAG

Friend of mine heard on recently as a group leader in design design for a firm with large production contracts for large aircraft. Design state of the airplane was somewhere between preliminary design and production drawings.

One of the friend's designers didn't produce for weeks, and a visit to his house found only the left foot and clearance dimensions in place-as details. When asked how come, the designer hedged a bit and then said what he should do. My friend suggested that maybe he ought to take a scribe through the bathtub here and there and check the needed various proportions figure the loads that were applied. "What's a scribe?" suggested the designer.

Well, my friend hedged that one and then the truth came out. The designer said something to the effect: "I used to be a scribe scribe—drew my cross of market trends and that sort of thing. One day I heard they were going jobs away in this outfit so I came up. Personnel guy says, 'What did you do on your previous job?' and I said, 'Draw curves, angles.' 'Fine,' said the personnel guy, 'You're a designer!' So here I am, a designer, and I don't know what the hell a scribe is or a bathtub is or a longhorn. They're paying me \$146 per week plus my contract, and I'm miserable. These two weeks have been the most miserable in my whole life and I'm quitting."

He did quit that first day. And my friend wouldn't who'd be the engineer.

\*\*\*

T. G. M. Sogreah, chairman of the Parker Society Group, was one of the great powers of the aviation industry. The kind of young thinking that he brought to his team and agile fighter of World War I still enlightens his comments. Listen to this plea for new thinking:

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frequency) so that a receiver with a 36-cc bandwidth can receive all stations on a single channel setting.

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• "Private Line"—Another way to reduce the need for VHF channels is the "private line." As envisioned, the system would permit ground transmissions of routine command messages to any single plane of up to 60 aircraft total.

By a true sharing procedure (from nothing first to not plane, then to the second, then to the third, etc., then back to the first, etc.) the private key writers is expected to operate on a single channel. To do this would require that each plane be able to store its message until it receives its next transmission.

U.S. activity, as described in *INTA*, centers on the use of a new satellite system which gives a potential TV-like presentation in the cockpit. The satellite is capable of viewing its intruder before, during, and after the transmission.

Major interest in private line systems to be concentrated in the U.S., the DATA consortium didn't feel it was urgently needed in international operations.

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## GUNSMITH RADAR ON LINE

Conquest rollers, rolled with giving U.S. jets the slanting edge on the M8C in Korea, are the first rollers to be produced on an assembly line here, according to General Electric, their manufacturer. The unit was developed originally for the Navy, but it's now studied for USAF and Marine use as well. The roller automatically determines target range for the competing nightjet (Aviation Week Feb. 25, 1982 p. 45).



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**Keywords:** 10<sup>th</sup> class, 400 m sprint, 400 m, 100 m

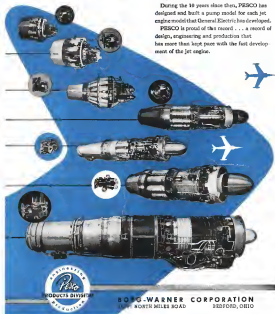
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## WHAT'S NEW

### New Books

U. S. Fighting Planes—1952, by Lt. Cmdr. Dale W. Cox, Jr., (USN), 64 pages, illustrated, price \$1.00. Published by Arco Publishing Co., Inc., 652 Lexington Ave., New York, N. Y.

Two items of the top current USAF and USN airplanes are pictured and described, with specifications, in this book. The photographs are large and

show the planes' characteristics well. The book is planned to develop recognition ideas of important U. S. military planes, with text kept to a minimum. There are notes where data that has been released (such as the B-54's armament) is not correct, but is tagged "retracted information." The author also discusses all gun armament as "muzzle gas," whereas many of the planes have cannon. But it seems to be a good buy at this price—EJB.

Design Manual for the Repair of Aluminum Alloy Structures, edited by

Howard M. Jensen, 236 pages, numerous illustrations, plastic binding. Published by Johnston Research Corp., Bethpage, Long Island, N. Y., price \$1.50.

This is a comprehensive work covering the wide area of repairs in aluminum structures, with particular emphasis on aircraft construction. It is well organized and illustrations are clearly and accurately drawn. The book should serve as an excellent and practical reference for designer and mechanic. Main sections are devoted to general information on structure and repair, materials and processing, repair procedures, standard fasteners, and an appendix of useful data—mathematical tables, formulae, solutions, equations, etc.

Persons who prepared the manual are reported to have been engaged for the past 10 years in designing and staining typical repairs for "Handbooks of Repair" supplied under contract requirements for military and commercial aircraft.

### Telling the Market

Residue describing typical products designed and produced in the interests of aircraft assembly field may be obtained by writing Riverdale Mfg. & Electrical Supply Co., 16226 Marquette Ave., Duane, Minn. . . . Four die casting lubricants are completely covered in Solider, Houghlin's Die Casting Lubricants, available from E. F. Houghlin & Co., 103 W. Lehigh Ave., Philadelphia 31, Pa. . . . Booklet outlining coil-cutting solutions to common problems in metal-lic arc, inert arc, and other fusion welding of alloy steels and describing Solder Flux, may be had from Flux Dept., Solder Aircraft Co., 2300 Pacific Highway, San Diego 12.

As Flow at Work problems and solutions, 38 problems, problems and how they were solved by using a combination of Mod air devices set up to provide semi-automatic or automatic operations. Available from Mod Specialties Co., Dept. NR3, 4114 N. Klein Ave., Chicago 41. . . . An automatic contour milling machine specifically designed for aircraft work on large dimensional parts such as gun barrels and propellers, at high speed, is described in bulletin available from Chard Machine Works, Inc., 1900 W. Palmer St., Chicago 42.

Fowler in Translucite bladders used in welding aircraft powerplants and airframes is used at engineers and design personnel, describes the Type K inside-out construction and Type R felt inside. Write John M. Fowler, 22 E. 43 St., New York 16. . . . Complete line of Robert Alcock engine for supplying power while planes are on ground is detailed in folder available from Motor Generator Corp., Troy, Ohio. . . . Bulletin 445 covers the con-



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- PERABLA** 140 permits stain cleaning of painted surfaces.
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- KELITE 8-0** keeps paint spray booth water corrosion clean.
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- PAINT 407H** removes oxidation, phosphates, aluminum.
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ret 3511 line of gas turbine and an operating engine starter, inverters, generators, aircraft motors, actuators, alternators, instrument generators, electrical system controls and hydraulic equipment. Work Jack & Boats, Inc., Cleveland.)

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Aircraft ballons and appliances are outlined in folder being distributed by Seta Aircraft Co., 2280 Pacific High way, San Diego 12.

## New Publications

**Aviation Quiz**, 1,001 questions and answers, is a neat little (about 5x7 in.) compendium of aviation facts about aerodynamics, aircraft design, such as: history, construction, development, aerodynamics, aircraft flight testing, etc. The answers to the questions are printed opposite the questions making it a convenient reference.

Published by Aero-Data, Box 909, San Carlo, Long Island, N. Y., 11430, price \$1.00.

## Publications Received

• **Tolerated Drawing**, by Joseph N. 31, Box 2, published by Simon Holt and Co., 177 Fourth Ave., New York, N. Y. 10012, \$4.75. A handbook for engineers, scientists, technicians, designers and project managers illustrated with photographic diagrams and charts.

• **The Love and Fear of Flying**, by Douglas D. Bond, M.D., published by Li-Gee Inc., 10001, published by International Underwriters Press, Inc., 127 W. 13 St., New York, N. Y. 10012, \$1.15. This book shows you of flying in the future, most of the U.S. Air Force pilots, it is contained in English. The author points up the role of accidents in the cause of safety and the role of safety in the cause of accidents.

• **Standard Design Manual for the Repair of Aluminum Alloy Structures With Particular Emphasis on Aircraft Construction**, edited by Harold M. Jones, published by Johnson Research Corp., 10th page, L. I., N. Y., 1951, \$1.50. Covers repair of aluminum alloy structures, this repair, corrosion and weld repair, repair, taking repair, etc. Each repair (over 70 in all) has been designed and stress analyzed.

• **Basic Aerodynamics**, by Merrill F. Torres, published by Aero Publications, Inc., Los Angeles, 1952, \$1.70. An elementary text book with more than 200 captioned photographs and drawings, and definition of various terms.

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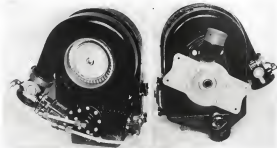
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AIR TURBINE DRIVE is designed for delicate jobs. Cooling air enters at lower duct (right photo), leaves through center duct.

## Air Does Hairline Job in Turbine Drive

TP 15-2 unit provides extremely fine speed control despite supply-demand changes, Stratus says.

By Scott H. Reiniger

Air has been harnessed to do a delicate drive and control job by Stratus Inc. of Fairfield Engine and Airplane Corp. The company's new air turbine drive will provide such desired features: sensitivity, despite drastic up and down in air supply, Stratus claims.

As, in effect, also computers and valves problems to keep the turbine drive in its more laid-in a constant speed—under widely varying conditions imposed by fast changing altitudes, temperatures, engine power settings, maneuvers and other factors existing in a jet fighter in flight.

In the TP 15-2 Air Turbine Drive, details of which are revealed here for the first time, no-operated controls keep the "steady state" speed of the turbine drive within 1 of 1% of that specified. "Actually, it can be less than that," says Stratus engineers. "We can't even measure the variation sometimes."

► **Job in Run-In**—The TP 15, like all others of its type, leads air from the jet engine compressor section. It was originally developed for the F281 Run-

about Navy fighter, to drive a radar after engine at constant speed, but it can be used for driving other accessories. Its thrust constantly is of utmost importance in radar gear since slight variations in power supply will leak accuracy.

First jet compressors at up to 4500, is ducted to the drive, then split up for several jobs. It enters one, of course, to make the turbine wheel rotate (at 22,000 rpm), turning the drive shaft (through reduction gearing) at a speed of 4,000 rpm. Other air is ducted off for control functions—to keep speed always at those constants, regardless of loads imposed by the alternator or changes in power supply.

To direct, the control is in the middle and must be done continuously from both ends—changes in the driving and driven ends—and must do so with a fine precision. This is a large order, perhaps readily comprehensible in a person holding two balancing beams, with a rope in each hand while keeping his arms down at his sides in a military stance.

Tremendous variations, caused by sudden changes, never cause speed to vary more than 5% and then only for short

a second at most, but usually less, Stratus says. This is maintained even when the alternator changes materially from zero to 100% load—as when an idling jet is suddenly pushed to full power, or pressure pile up in a high speed drive.

► **Agile Control**—Clapnet, of the equipment, to maintain constant speed despite those acute challenges is a result of the ability of its no-operated control, Stratus says. Any change—and all changes lead down at the control to a change in speed of the turbine drive—around within 5 milliseconds, necessary is started within 10, and full corrective action takes in 120 milliseconds. This control has been completed in that time to compensate for the particular variant arising.

In the final analysis, all control action is directed at moving a throttle valve one way or the other to supply more or less air to produce more or less power to the turbine wheel to keep it at a constant speed.

► **No "Drop"**—The control is a "no potential rest and one down" in its activity. "It brings drive speed right back on the line," Stratus engineers emphasize. There is no "drop" at all, they



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Then, Inconel "X"® is your alloy! An unshakable alloy, it has every one of the properties mentioned—and a good many to spare. The jet plane afterburner bellows shown above is one application where Inconel "X" filled the bill perfectly; there are countless other aircraft jobs where it also meets all needs.

Let's take a brief look at some of the principal characteristics of Inconel "X":

After suitable heat treatment, it is an unusually strong alloy both at ordinary temperatures and at red heat. It offers excellent resistance to oxidation at high temperatures.

Its stiffness, or modulus of elasticity, is high—about equal to that of alloy steels.



ALL WEATHERS have power, but your Inconel design problems. In these conditions Inconel acts as a single and often heavier metal without high loss, but through desired shape, strength and good form. The Inconel metal is a gas-tight, flexible material effective in applying into delivery work with top efficiency. Designed and manufactured by Inco Aircraft Company, New York, N.Y. The Inconel is made from 90% nickel, 10% chromium which is welded into a greater level—and then accepted.

Resistance to impact is good, too. And you also have hardness... machinability... good forming and fabricating qualities. As for welding, this can be accomplished by most of the commonly-used methods (including metal arc, inert gas metal arc or atomic hydrogen arc), resistance spot and seam, and resistance butt. In short, Inconel "X" is the kind of metal you can work with—and get the results you want.

Naturally, there is not space enough here to cover all of the properties and characteristics of Inconel "X". So we've prepared an 80-page reference manual and packed it full of the kind of information we thought you'd like to have. You can get a copy—without charge—by dropping us a line and asking for the "Inconel 'X' Data and Information Manual." Write for it now.

One final—and important—point: Inconel "X", like other nickel alloys, is now on extended delivery because of defense needs. So it is important to include NPA rating and complete end-use information with all orders.

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ing, and no burning either. (Droop ceases when recovery speed levels off at a steady state below that for which the droop is rated.)

The control means change in speed and the rate of flow change. In this way, it determines the extent of corrective action. Most of the unit is a special governor covered "by some very basic patents," Stratos told five reporters. It is the governor that permits handling of transients of 40:1 in one second.

So predictable now is engineering of equipment of this type that it can be built to operate stably within 7% of the maximum air pressure delivered by the jet engine, company engineers claim.

All the performance capabilities of the air turbine drive described above can be turned out with a supply pressure from the jet of only 40 ps. An answer to the turbine wheel shaft is kept no higher than 5 psi by the control which handles supplies as high as 85 psi when the engine is at full power.

Despite this wide variance, reaction time of the control is about the same. This is true even in a condition, say, of low pressure, where the throttle must be opened twice as far to gain the same work as it a higher pressure, Stratos says. Automatic gas control simply moves the throttle twice as fast.

That is the simple answer but it's not simple to do, Stratos points out, with all the responsibility and compatibility and other factors encountered when dealing with air.

Simple Design—Moreover, while the control gives fine performance, it is made with simple parts and methods. It is strictly pneumatic and mechanical in operation. No delicate resistance headlaches have been installed. Every thing has been either stamped, die cast or fabricated on a screw machine. The only three delicate in the engineering design work, according to the firm. "The control is 'perfectly self-cleaning,'" Stratos says.

High Power—With the air turbine operating on the low controlled pressure in it does in the Raytheon, it is rated at 15 hp, but it can give 40 hp at higher pressures are used. Theoretically, if the gas could stand it, a unit of this size could deliver as high as 175 hp, Stratos says.

Good, incidentally, and alternative too, are cooled by a fan during ground operation and by a combination of air and sea air during flight. That explains the two ducts on the mounting pad job of the unit. They are not for air cooling purposes. In the front view, air enters the duct opening at the lower left, passes by the turbine wheel and enters the duct opening at the rear. The complete equipment weighs 35

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ly, including programs for a self-contained ad system. It covers all military specifications, the first states:

► Many jobs—Struts primarily supporting drives in a wide range of sizes, up to 300 hp. and down to cushion type jet units. Up to 200 hp. can be built if desired. They can be used for a wide assortment of tasks—driving very heavy sections (in both directions of rotation), fuel pumps, hydraulic pumps, compressors and other gear.

The company will produce drives operating at supply air temperatures as high as 600°F., pressures of 250 psi and environmental temperatures from -75 to 200°F. In general, one drive should operate one accessory, not more, for exact satisfactory results, the company believes.

► Air Experiences—Struts point to its use as turbines as the culmination of ten or eleven years of experience in development of engine superchargers, turbo superchargers and turbochargers and cooling equipment for the modern aircraft engine.

Drives such as these offer a freedom in handling otherwise, the company points out, as they permit accessories that otherwise would have to be driven directly off the engine to be located at will in the aircraft. This simplifies design and overhauling of the engine.

With jets it favors that diameter of the envelope will not be needlessly enlarged by a protruding accessory. As accessories can be placed where they can

be most easily reached for corrective action in flight and on the ground, if need be.

Struts look at equipment for the job at hand, as in lighting, as any load can be found. And by using air, it avoids some problems of liquid systems—leaking of air lines is not as critical, for instance.

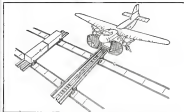
Struts to determine if it is more efficient to drive accessories remotely by an belt off the jet or to drive them directly off the engine have not established any general rule to follow, Struts says. Each case must be decided on its merits. But the trend is to take them off the engine, the company feels, as drives like these should become a more common sight.

### Telescoping Boom Structures

Specialized servicing and maintenance of large aircraft is promoted with a new mobile boom recently developed by the Dowell Co., Portland, Ore.

New being studied by engineers of leading airlines, according to Dowell, the boom carries a ground concrete shaft and allows him to lower over various sections of the plane. He may swing from filler cap to filler cap in refueling operations, never touching the wing.

Since the boom is over 30 ft. long, trailers can park further from places than is now practical, making for greater safety, from fire hazards.



#### NEW ZEALAND'S FAST CARGO LOADER

The boys "Devo Loader" have come up with this plane loading device to save time and manpower. Ground time is shaved from one hour to 15 min. with the loader. In operation, the loaded plane is towed to one end of the platform (A) and the pre-packaged cargo, contained in two "cups" is rolled into the device (B). While unit is then moved sideways to waiting trucks while ac-

The boom is fixed to the back of a truck, supports the weight of a "man's roof" at its tip. From this vantage point he can swing—up, down, left, right and sideward—with six foot paths using no electric power.

Vacuum points in the plane can be checked from this perch, as a function of the time usually required, says Dowell. To avoid tapping the vacuum, for cargo, which has a wall of high protective lining, is self-healing, regardless of the angle the boom uses. The edge also is completely insulated electrically, the flooring being of Mosquit grating 24-gauge protection and the whole gear mounted on the boom in special, heavy-duty castings. Various

service, such as compressed air, can be provided at the edge.

The boom can assume any position through a 90 deg. arc from horizontal to vertical and at any point can be telescoped in or out. It can be rotated 370 deg. No counterweights are used.

Inside the truck, there is a duplicate set of controls. The boom looks automatically of the engine shaft. When not in use, it can be retracted for storage, providing 30 ft. clearance. It can be retracted on any 200 or larger track if the distance from the rear of the truck to the rear axle is as much as 100 ft. Dowell Co., 515 S. E. Main St., Portland, Ore.

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## Technical Service Data Sheet

Subject: PROTECTING ALUMINUM WITH **ALODINE®**

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"Alodine" No. 600 forms corrosion-resistant coatings that provide excellent protection for exposed aluminum and also make an effective primer base. This grade is recommended for use on plate of "Alodine" No. 100 on aluminum parts that are to remain exposed or to be only partly protected, and on all aluminum castings and forgings whether or not these are given a prime finish.

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"Alodine" No. 600 is applied at room temperature (70° to 130° F.). It coats exposed casting times are 3 to 5 minutes for an immersion process and 1 to 15 minutes for a spray process.

CONTROLLING DATA	"ALODINE" NO. 100	"ALODINE" NO. 600
COMPOSITION	See product literature	See product literature
COATING	See product literature	See product literature
PREPARATION	See product literature	See product literature
APPLICATION	See product literature	See product literature
FINISHING	See product literature	See product literature
STORAGE	See product literature	See product literature
SAFETY	See product literature	See product literature
TESTING	See product literature	See product literature
REMARKS	See product literature	See product literature
DATE	See product literature	See product literature
BY	See product literature	See product literature
FOR USE ON	See product literature	See product literature

## Non-Destructive Test Service Set Up

Spery Products, Inc., has established a new "road" service, providing equipment and personnel at a fee to identify for presence of defects in metal and plastic parts, by means of non-destructive testing.

The equipment was developed by Spery and has been used by airlines for continuous purposes. It can detect cracks in aluminum stress members of aircraft, as well as old, for production-line in field work.

It includes a Reflectoscope, which finds faults by ultrasonic techniques. The device has successfully located defects as small as 40 in. from the point of contact on the metal surface, Spery says.

Uniformity of metal thickness can be determined by a compass probe, the Reflectoscope. This permits measurements to be made from one side.

The Reflectoscope locates discontinuities by detecting high frequency sound vibrations, and measuring elapsed time of reflections from discontinuities in the path of the beam. A crack can interrupt the signal, for example.

The service was established for those concerns having only occasional use of such equipment, but whose needs do not warrant purchasing it or training personnel in its use. Through branch offices, Spery is prepared to give day-to-day service to customers throughout the country. But if parts are small enough, they may be sent direct to Spery's laboratories for checkout, to be returned with a report on condition and photographs of hot patterns.

Spery Products, Inc., Embury, Conn.

## NEW AVIATION PRODUCTS

### Sealant Remover

Kelite Dural-1 NS, a good and simply removed of fuel tank sealants in aircraft, has been announced by Kelite Products, Inc.

The advantage claimed for this product by the maker is that no solvents are required when it is used to prevent etching of fuel tank metals. Kelite notes there have been scattered instances of inadvertent etching when solvents were used with other sealant removers were stored by action of residual poisons and in the subsequent operation.

Dural-1 NS permits successful striping of most tank sealants by the 95-

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• To install a Hansen coupling, you merely push the plug into the socket with one hand. Flow is instantaneous. To disconnect, push back sleeve to sockets—simple disconnection. Flow is shut off instantly and automatically.

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DISCONNECTIONS			
SAFETY	STEEL	STAINLESS	BRASS
ALUMINUM	COPPER	INVAR	SAFETY
STAINLESS	STEEL	STAINLESS	BRASS
ALUMINUM	COPPER	INVAR	SAFETY
STAINLESS	STEEL	STAINLESS	BRASS
ALUMINUM	COPPER	INVAR	SAFETY

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**SINCE 1940** Schuttig and Company has been designing and manufacturing electronic devices to meet exacting requirements of government agencies, manufacturers and airlines. As specialists in communications, remote control and navigational equipment, both ground and airborne, Schuttig has earned its reputation for electronic precision.

**Schuttig and Company**  
*Incorporated*  
Washington 17, D. C.

**Electronic Manufacturing Engineers**

and does bond release method—considered the most desirable. Keltie says in those cases where the new diameter can't be won, the firm has two other remedies to fill the gap (Desal A and Desal 2.4) which permit instant removal by the fill-and-draw, spray or brush-back technique. One of Keltie products, according to the firm, veridically dissolves all hard deposits.

Keltie Products, Inc., 1159 N. Main St., Los Angeles.



### English Valves

A hydraulic selector valve for opening pressures up to 4,000 psi., is being offered by Dewey Equipment Ltd.

The valves are electrically actuated, controlled by switches in the cockpit, and are designed to meet rapid response with maximum pressure drop. The model shown in the sketch above is a four solenoid type Model 4400 Y. It provides a four way, three position selection, with a neutral position. Other sizes may, two solenoid types, with or without a neutral position, or with flow to the selected service either open or closed after de-energizing, are available.

Normal flow capacity of valves is 20 gal./min. They are built for operation at temperatures down to -55°F. The single solenoid type weighs 3.5 lb. and the two solenoid 2.5 lb.

Dewey Equipment Ltd., Airs Court, Chalfonts, England.

### Resists Skydrol

An aircraft was designed to meet chemical action of Skydrol non-flammable type hydraulic fluid and low temperatures is being marketed by Supacut Mfg. Co.

The wire, reportedly meets Spec. MIL-W-5274A, resists oil, grease, kerosene, chemicals and flame. It is protected by an extruded primary insulation made from Goro polyvinyl chloride plastic and nylon jacket. The plain insulation won't crack at a temperature of -54°F., withstands 5,000 v. a.c. at 60 c. rms. The complete wire, with a glass fiber braid covering the nylon-Goro insulation, meet withstand 12,000 v. rms. to meet military specifications. A Type III wire has glass fiber braid covered by Goro.

Supacut Mfg. Co., Boston, Mass.

## SHELL AIR QUIZ



*Question:*

Does air travel cost more or less per mile than 10 years ago?

*Answer:*

While the cost of living has almost doubled, air travel today costs less per mile than a decade ago.

*Question:*

Which Aviation Fuel in the U. S. A. today flies the most passengers?

... the most air freight?

... the most air mail?

*Answer:*

**SHELL AVIATION FUEL**

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## AIR TRANSPORT

### 'Public Interest' to Decide Colonial Sale

- Carrier cannot count on selling to highest bidder, CAB warns in letter to President Dykes.
- Nyrop action is prompted by Colonial rejection of merger with National and action asking for bids.

By F. Lee Moore

Colonial Airlines Board has warned Colonial Airlines President Branch Dykes that he cannot count on selling Colonial to the highest bidder. The necessary CAB approval will depend on whether the merger is "in the public interest," the Board says.

What prompted the warning letter from CAB Chairman Donald Nyrop was the fact that Colonial is up for sale right now, with bids slated for auction this week. A National Colonial merger was spent May 14 by a Colonial stockholder minority claiming National's price wasn't as good as an offer at Eastern Air Lines.

The new union distasteful CAB, especially since the National deal already had been approved by the Board, whereas "the Board has not to date authorized the same purchase agreement (of Colonial merger) with any other airline."

In his letter to Dykes, Nyrop notes that, as a matter of fact, the Board may not down the price, even if it appears the rest of a particular airline would buy it.

► **CAB Terms**—In his warning to Colonial, Nyrop notes the main consideration of the Board in approving any merger or airline purchase.

- Further traffic integration
- Improve route structure for the U.S.
- Create desirable competition.
- Avoid excessive competition.
- Build smaller airlines. On this one, CAB said "The Board (must consider)

whether the resulting routes tend further to unbalance the competitive relationships existing between the various carriers concerning our air transportation system." Since Washington observers think that implies the Board might prefer National over the larger Eastern, though CAB might not do so, as in Eastern purchase of Colonial.

► **CAB Sets the Price**—"The Board, of course, must pass upon the purchase price of any agreement which shall be submitted for approval and will do so in order to protect the public and the

stockholders from either an excessive purchase price or an unreasonable low purchase price," Nyrop's letter stated.

The point of that point was the Board's decision on the Northeast Airlines buy of Midwestern Airlines in 1948.

The contract price for the bankrupt Midwestern, which hadn't operated in five years, was \$17,500. The Board disallowed that. The proposed price was worth only \$10,000, the Board said, and that was the price CAB would approve. As for operating rights and good will, CAB stated "It is of course to the public interest to protect the transfer of value in such a way that they were a speculative security."

So regardless of what airlines may bid for Colonial this Thursday, CAB may settle it to the fair value of the equipment and property only.

► **No Auction Block**—To make the air traffic even closer, Nyrop notes Col-

and is follows: "... You have advised the Board that Colonial Airlines has placed itself in a large measure in the service of the public and it will consider the bids submitted by all carriers to whom an aviation was extended. This action early comes with it the implication that Colonial is more interested in the purchase price of a sale of the company than it may be in the various other aspects of the public interest."

► **Board Procedure**—The Board has a public hearing scheduled for this Wednesday to investigate "whether a merger or consolidation of National and Colonial Airlines would be in the public interest and in accordance with the public convenience and necessity." In his letter to Dykes, Nyrop notes that "Colonial is a substantial airline and certain public benefits may result from the integration of National and Colonial."

### Lod Influence Grows

(McGraw-Hill World News)

Tel Aviv—Increased use of Lod (formerly Lydda) Airport is an important step between Europe and the Far East as seen with establishment of direct routes between Israel and Japan.



MODERN AIR TERMINAL TO SERVE CHICAGO

This is how the new terminal building at O'Hare Field, Rosemead, Ill., will look when completed, with five "fingers" wings capable of handling 50 transports simultaneously. Construction will be completed in 1960, by which time the new terminal will be in operation. Total enclosed floor area is the completed

two-story terminal will be 13 million sq ft. Unenclosed gate rooming area, hot and cold water lines, cables, movable exhaust and air conditioning ducts, electric ducts and cables and towers will serve each of the plane positions which are to be located on the ramps.

## Growth of Civil Aviation Since 1941

During 11 years, 1941 through 1951, civil aviation mileage doubled, revenue passengers of the scheduled airlines increased six times, the number of U. S. airports 2.3 times and Civil Aeronautics Administration personnel three times, according to information submitted by CAA to the Senate Appropriations Committee. Here is a breakdown of information supplied by CAA:

Year	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Controlled Civil Airports											
Albany	26,062	28,688	31,386	32,448	40,283	44,145	47,825	56,769	61,380	79,352	78,424
Bus. Pass. Carried by Scheduled Airlines (in thousands)	4,027	3,486	5,220	6,302	7,552	13,254	18,549	18,458	19,825	24,648	26,418
CAA Employees	4,618	4,658	10,489	11,807	12,762	14,383	17,058	16,500	19,345	20,206	21,200
U. S. Airports (Private, Commercial, Military)	2,484	2,418	2,749	3,422	4,626	4,900	5,719	6,414	6,184	6,415	6,257

## Civil Penalty Power For CAB Is Urged

Congress, before it closes, may give Civil Aeronautics Board a new club to hold over misdeeds.

Legislation giving the Board authority to impose civil penalties for economic violations, up to \$1,000 for each offense, has been approved by the Senate Interstate and Foreign Commerce Committee. Requested by CAB, it would apply to scheduled as well as nonscheduled carriers, but it is directed at the new ones. Board would have authority to compare fines and settle these out of court.

CAB at present can take two courses with economic violators:

- Issue a cease-and-desist order or a civil penalty order.
- Initiate, through a U. S. attorney, a civil action for an injunction or a criminal offense.

The Senate committee said:

"From a practical standpoint" injunction and criminal proceedings can only be used as a last resort in cases of licensing or safety violations, and the criminal action is not appropriate except in the most flagrant and serious cases.

The only other existing remedies for economic violations—cease-and-desist orders and injunctions—operate only against future conduct. Thus, as offenders in a serious case of this kind, are exercising a little caution, to engage in illegal practices such as misrepresentation or concealment and even even conduct such conduct during its persistence.

"The penalties here to keep economic records from unlawful conduct are considerable periods of time without undue danger of increasing monetary penalties. Availability of civil penalties would tend to take the profit out of economic violations, and in this way provide a strong deterrent to unlawful

conduct. Experience has shown that civil and not punishment is frequently more effective than heavier punishment already inflicted. The civil penalty would permit the Board to act swiftly in dealing with most offenders."

## European-American Case Given Boost

Chances of European-American airlines getting a CAB certificate to fly trans-Atlantic air cargo traffic service have taken a slight turn for the better, although the Board is still expected to disapprove EAA's application for a two-year Secretary of Defense Robert Lovett has written CAB Chairman Donald Nyeer saying, in part:

"The Department, of course, can not support any individual operator or class of operators to itself... requirement."

"However, the Department would

like to point out, as in the past, that the purchase and operation by the air transport industry of new long-range transport aircraft as cargo configurations is in the interest of national defense. A well-developed trans-oceanic air cargo industry would be of mutual assistance in meeting wartime military airlift requirements."

Washington observers believe this will not help European-American much with the Civil Aeronautics Board, but it may raise some psychological weight. The President must approve a CAB decision on international routes and operating certificates. The Board is expected to vote 4 to 3 against EAA's application this month, then the CAB decision will be sent to the President, who usually goes along with Board decisions but has overruled it in some notable cases.

European-American's application is considered as the first economic case since one of TWA and Pan American. The Board and the President are expected to approve the TWA and Atlantic certificate in about that period next year.

## Northwest, National Merger Hits Snag

Recurrent negotiations between Northwest and National Airlines aimed Northwest's decision to give its Capital merger application through this month.

However, just when Northwest President Carl Heath, National President G. B. Baker, and Northwest's management agencies stakeholders seemed to be reaching common ground, negotiation hit a snag.

What that snag is has not been reported yet, but observers note that there is more than one obstacle in any scheme trying to close a deal for merger with Northwest first, its market value is

low, under book value and its financial picture is bleak; these financial facts make Northwest difficult to prove.

Secondly, dominant stockholders of Northwest are in a strong position, as there has been no working majority in NWA that could be counted on to carry a merger deal through.

## Ex-Official Hits African Air Agency

(McGraw-Hill World News)

Johnstonburg—Step children of the government division of civil aviation in South Africa from member is member has snatched the pole.

Col. F. C. Elton Wilson, who has served as Chief Inspector of Flight in the division, has stated that only the skill of the state-owned South African Airways pilot has prevented an accident, some not only are transported into Johannesburg but the advice of airports is being ignored by the government agency.

Coordinate in the past few years, says Col. Wilson, has determined considerably. Disasters have been caused and policies formulated that are impossible to carry out, he says.

Wilson, who is an expert pilot and one of the only two South Africans to have been awarded the British Pilot's Certificate of the British Empire, upholds another director of the agency who also served recently, Col. D. G. Hayward. Hayward once as flying instructor in order to make pilot the game and French pilot, says Wilson, and other operations during flight made under bad weather conditions."

## AA Treasurer Sees Peril In Rate Ceiling

American Airlines vice president, treasurer W. J. Hogan, looking to the future, has warned predicted more effect distant hopes of revenue, expense, capital and expense despite to come for American and the industry as a whole during this period.

He pointed the picture as follows for the initial benefit of the Cleveland Society of Security Analysts, as follows: The industry's reduction of Civil Aeronautics Board—controller of airline fees.

• CAB ceiling on fares now places some airlines back on the subsidy side "before too long unless a formal approach is made."

• "We are still hopeful that the CAB will reconsider its recent refusal to let airlines eliminate the 1% round trip subsidy."

• "Costs in 1952 will be higher than for 1951 and, with a return to normal load factors, some further up

ward adjustment in rates and fares will be necessary."

• The industry needs "at least five cents of good add-on charges to give carriers a margin of 40 cents and a reasonable degree of stability."

• Capital commitments of the industry should total \$150 million for new planes. Another \$150 million may be required (before 1952) with the advent of turbine engines.

• In a recession, "airline might suffer as income is reduced" because that's when the industry makes its "greatest needs, in other competitive services."

• American's 1952 revenues "will be from 10 to 15% above 1951."

• Net profit "may compare favorably with that of the past two years," although the profit margin will be lower.

• If 1952 volume meets expectations, "the industry would require an annual amount of only a little over 1% from 1951 to 1952 to 1955 to meet their capacity at a good load factor."

## S & W Makes New Bid For Certification

Schlesinger & Western Airlines, a consolidated international airline last year, has asked CAB to reconsider the denial of the carrier's application for a trans-Atlantic and European all-cargo route certificate without subsidy.

Schlesinger CAB "disapproved the views of the Department of Defense in denying the certificate, and quoted a letter from Undersecretary for Defense State Early Jan. 12, 1951, stating in part: "The Department favors the submission of an all-cargo certificate on this route" and "whatever practical or comparative use can be given to the air freight industry will be of especial military interest, as long-range all-cargo service are potentially adaptable to military requirements in the event of an emergency."

## CAB Sets Hearing On Brazil Crash

CAB Accident Investigation Board plans a hearing in Miami within a few days on the April crash of the Pan Am Stratocruiser in the dense jungle at central Brazil. But there is a little reason to see it.

The crashplane down a lightning bolt to crash the plane with the right engine and another the wreckage, but they have been laid back by:

- The people, and its distance from airport.
- Effect of the first attempt when they had to evacuate and find a publicity-seeking Brazilian politician group that

parachuted in ahead without equipment.

• The Brazilian government's stand in an international fight to conduct the investigation in its own way.

## American's Coach Passenger Survey

An American Airlines market survey of its coach customers reveals:

- 61% are women, whereas on scheduled line flights 73% are men.
- 61% are executives, whereas on scheduled flights are 75% business.
- 75% plan to stay more than a week, whereas 34% of passengers on other flights stay less than a full week.
- 61% are married, 40 single, while 90% of scheduled lines are under 40.
- 17% are first class, compared with scheduled flights having 5% first class; 44% class travel, compared with 55, 50% on scheduled lines.
- 65% traveled alone.
- 18% of the low fare in the reason for being coach.

## Noasked Case Goes To Supreme Court

How can CAB control the established between of a scheduled airline by regulation? That is the question the U. S. Court of Appeals, D. C., has thrown up to the U. S. Supreme Court, with next week's fall.

The question was raised by American Air Transport and Miami Airlines' appeal and get the direct court order to open CAB from using a new regulation limiting airlines to their own month. The question was raised by American Air Transport and Miami Airlines' appeal and get the direct court order to open CAB from using a new regulation limiting airlines to their own month.

CAB appealed and the three appellate judges couldn't agree on a decision but unanimously refused the question to the Supreme Court, declaring that this is a question of judicial and executive supervision in the field of administrative law."

The question—When CAB has control regulatory authority, and on an air line has gone into business, is it a mere regulation that says that business?

- And under an adjudication hearing a field? Or void if it merely defines the terms of an air regulation "in ways not known to be arbitrary or capricious?"

• Or does it depend on interpretation of whether or not the new regulation does or does not in fact "change the terms of the established regulatory authority?" Or does "its validity depend on some other condition?"

## Tories Relax Hold On Airline Routes

By Nat McKitterick

(McGraw-Hill World News)

**London**—The door has been opened slightly by private operators to compare on Britain's home and overseas markets.

In an official announcement, designed to fulfill a campaign pledge without requiring new legislation, the Toy restraint succeeds.

• **Authorised Britain's** 30-odd private airline operators to compete with BOAC and BEA, by permission to operate new scheduled passenger services to Europe and overseas.

- Authorized private operators to compete with the state-owned corporations on all freight services, new and old.

\* Authorised private operators to introduce special "third class" fares—fare is lower than tourist fare—on services already operated by the state-owned corporations within the British colonial empire. (Such services outside the empire would run about IATA rates, of course.)

- Prohibited the state-owned express train from carrying mail specifically for charter

The new policy is a good first step that the private operators had hoped. Many want to operate tourist services everywhere while state-owned airlines operate just domestic lines. The private operators claim the new policy excludes them from just about all profitable fields of activity. Nonetheless, they say, they will do their best to accept "the number of opportunities" offered while pursuing its "other conscious life."

► **British CAA**—Under the Civil Aviation Act of 1986, no private operator is permitted to run scheduled services. All operators wishing to take advantage of the new provisions will have to make "associate" agreements with one of the state corporations. Right now, BAA has 16 such agreements with private operators. BOMC has one

Likewise, in the absence of new legislation, the licensing authority will be the Air Transport Advisory Council, a statutory body set up to advise the Ministry of Civil Aviation. Eventually, ATAC will probably be reorganised into an authority similar to CAA. But at the start, the authority will be headed by the new Minister of Transport and Civil Aviation, A. T. Lorenson, BSc, who said he will consider the advice of ATAC on fixed air control equipment.

The first applications before ATAC are likely to be those companies who already have associated agreements with IEA or BONG. These agreements, with one exception, have been limited to one and two years in most cases, and never more than five. The private operators claimed only a short period made it too risky to wait the necessary agreement needed to operate unlicensed services. The government has agreed and now promises that all associate agreements should run for seven years or perhaps less in some cases.

These warm-blooded species are also worried about the availability of nests for the new exposures of their species. Most are added with overages and inadequate equipment. It was only last month that the first parasite Bristle sparrow—Aurora, Ltd.—received more than four eggs per nest, see *Handy-Pipe* March 1988 from BOAC. Lewis-Rose told the Committee he was aware of this problem and would have to

maneuver do everything possible to see that the supply is assured. But obviously the competition for aircraft is very tough in these circumstances too.

Let's involved by the new policy is the question of what happens to HEA internal services in the UK, most of which are paid a lump sum to earn the title of "social services". Korea had it that all these would be thrown open to competition from the private sector, but at the time of the new announcement, the Ministry of Civil Services hadn't made any decision.

BEA itself is set against any such competition on the grounds of "redundancy." BEA seems to have secured exclusive control of the only important internal services that do pay—London and Manchester to Belfast, and London to Glasgow. The government was firm against granting any subsidies to private operators undertaking new internal routes, with the possible exception of Scottish Island routes.

The Labour Party, very honestly as the result of sweeping gains in recent municipal and county elections, greeted the new policy with much more jolting than was expected. In all probability the Labour Party will promise to limit severely the operations of private operators when Labour gets back into power. That threat probably will darken further the prospects of any sizable investments in private coal ventures in the near future.

## CAB Sets Cause In United DC-3 Crash

Probable cause of the fatal United Air Lines DC-8 training flight crash last Dec. 4 near Denver was an accidental spin at too low altitude to recover, CAB finds. There should the plane was killed.

Investigators found no evidence of mechanical failure, and since the plane had started to recover before it hit, the Board decided the spin was not a result of mechanical failure.

• **Plane Stalled**—The instructor pilot was in the captain's seat. He and the two trainee first officers apparently were practicing slow flight on instruments. According to witnesses, the plane stalled in a power-off glide, then full power was suddenly applied. But the plane stalled and spun in less than 3,000 ft above the ground, 5,200 ft above sea level.

The Board mentions earlier in its report that all operators in the Denver area had always practiced slow flight instrument training maneuvers within

the altitude range from 5,000 to 9,000 ft. above sea level—or 5,000 to 4,000 ft. above the ground at this spot.

Presumably this altitude was sanctioned by all officials, CAA and inland, in the area. Yet if a DC-3 got into a spin at this altitude, it probably couldn't recover, according to tests by United, the National Advisory Committee for Aeronautics and others. Thus, flight training in the Denver area was conducted at an unsafe altitude. This practice has since been changed.

## Private Flying Up in Italy

McCabe Hall World News

**Rome**—Private flying in Italy last year continued to show steady growth.

The number of flying clubs totaled 64, the same as 1995, but this year's equipment went up to 268 aircraft, against the previous year's 190, and the flight time increased from 1995's 32,774 hr. to 18,907 hr. last year. There were 46 powered flight clubs last year, an increase of eight over 1995. Eight gliding clubs were listed. About 100 flying hours were awarded.

### Eight Airlines List

### Executive Salaries

Illustrative statistics of eight subjects reported to CAR for 1951, with 1950 figures in parentheses:

**1982-1983** **1983-1984** **1984-1985** **1985-1986** **1986-1987** **1987-1988** **1988-1989** **1989-1990** **1990-1991** **1991-1992** **1992-1993** **1993-1994** **1994-1995** **1995-1996** **1996-1997** **1997-1998** **1998-1999** **1999-2000** **2000-2001** **2001-2002** **2002-2003** **2003-2004** **2004-2005** **2005-2006** **2006-2007** **2007-2008** **2008-2009** **2009-2010** **2010-2011** **2011-2012** **2012-2013** **2013-2014** **2014-2015** **2015-2016** **2016-2017** **2017-2018** **2018-2019** **2019-2020** **2020-2021** **2021-2022** **2022-2023** **2023-2024** **2024-2025** **2025-2026** **2026-2027** **2027-2028** **2028-2029** **2029-2030** **2030-2031** **2031-2032** **2032-2033** **2033-2034** **2034-2035** **2035-2036** **2036-2037** **2037-2038** **2038-2039** **2039-2040** **2040-2041** **2041-2042** **2042-2043** **2043-2044** **2044-2045** **2045-2046** **2046-2047** **2047-2048** **2048-2049** **2049-2050** **2050-2051** **2051-2052** **2052-2053** **2053-2054** **2054-2055** **2055-2056** **2056-2057** **2057-2058** **2058-2059** **2059-2060** **2060-2061** **2061-2062** **2062-2063** **2063-2064** **2064-2065** **2065-2066** **2066-2067** **2067-2068** **2068-2069** **2069-2070** **2070-2071** **2071-2072** **2072-2073** **2073-2074** **2074-2075** **2075-2076** **2076-2077** **2077-2078** **2078-2079** **2079-2080** **2080-2081** **2081-2082** **2082-2083** **2083-2084** **2084-2085** **2085-2086** **2086-2087** **2087-2088** **2088-2089** **2089-2090** **2090-2091** **2091-2092** **2092-2093** **2093-2094** **2094-2095** **2095-2096** **2096-2097** **2097-2098** **2098-2099** **2099-2100** **2100-2101** **2101-2102** **2102-2103** **2103-2104** **2104-2105** **2105-2106** **2106-2107** **2107-2108** **2108-2109** **2109-2110** **2110-2111** **2111-2112** **2112-2113** **2113-2114** **2114-2115** **2115-2116** **2116-2117** **2117-2118** **2118-2119** **2119-2120** **2120-2121** **2121-2122** **2122-2123** **2123-2124** **2124-2125** **2125-2126** **2126-2127** **2127-2128** **2128-2129** **2129-2130** **2130-2131** **2131-2132** **2132-2133** **2133-2134** **2134-2135** **2135-2136** **2136-2137** **2137-2138** **2138-2139** **2139-2140** **2140-2141** **2141-2142** **2142-2143** **2143-2144** **2144-2145** **2145-2146** **2146-2147** **2147-2148** **2148-2149** **2149-2150** **2150-2151** **2151-2152** **2152-2153** **2153-2154** **2154-2155** **2155-2156** **2156-2157** **2157-2158** **2158-2159** **2159-2160** **2160-2161** **2161-2162** **2162-2163** **2163-2164** **2164-2165** **2165-2166** **2166-2167** **2167-2168** **2168-2169** **2169-2170** **2170-2171** **2171-2172** **2172-2173** **2173-2174** **2174-2175** **2175-2176** **2176-2177** **2177-2178** **2178-2179** **2179-2180** **2180-2181** **2181-2182** **2182-2183** **2183-2184** **2184-2185** **2185-2186** **2186-2187** **2187-2188** **2188-2189** **2189-2190** **2190-2191** **2191-2192** **2192-2193** **2193-2194** **2194-2195** **2195-2196** **2196-2197** **2197-2198** **2198-2199** **2199-2200** **2200-2201** **2201-2202** **2202-2203** **2203-2204** **2204-2205** **2205-2206** **2206-2207** **2207-2208** **2208-2209** **2209-2210** **2210-2211** **2211-2212** **2212-2213** **2213-2214** **2214-2215** **2215-2216** **2216-2217** **2217-2218** **2218-2219** **2219-2220** **2220-2221** **2221-2222** **2222-2223** **2223-2224** **2224-2225** **2225-2226** **2226-2227** **2227-2228** **2228-2229** **2229-2230** **2230-2231** **2231-2232** **2232-2233** **2233-2234** **2234-2235** **2235-2236** **2236-2237** **2237-2238** **2238-2239** **2239-2240** **2240-2241** **2241-2242** **2242-2243** **2243-2244** **2244-2245** **2245-2246** **2246-2247** **2247-2248** **2248-2249** **2249-2250** **2250-2251** **2251-2252** **2252-2253** **2253-2254** **2254-2255**

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Laguardia Airport has added a 25-ft x 150-ft swimming pool to its facilities. The outdoor athletic pool, with diving tower, is located adjacent to one of the airport's runways, giving tennis

area = good view of arriving and departing planes. Also currently opened at the \$50-million terminal was a 400-seat air-conditioned restaurant and a month night club. The hotel covers 20,000 acres.



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(Vacation Week June 9, p. 34 and  
Apr. 14, p. 30)

► Flying Time Line low bid for Natick's Navy supply 181 contract a tentative accepted by Navy, emphasizing on CAG approval of the low rate of 71.9 cents a C-46 plane mile. Six planes would operate the scheduled Navy supply base policy and delivery service.

► House of Representatives bill proposed by Rep. Clair Burke of California would require that strike suits and suits be kept in the standard suits for civil or non-civil.

► Independent Military Air Transport Association bid for volume is 532 million a year. President Ray Clark announced to be selected speech at the organization's annual meeting. Pending choice of a new addition, colored personnel, Blomfield Keith will head IMATA.

► National Airlines had losses in May was 54%, compared with 56% a year ago, but five days of price at 68% compared with 67% average for last year.

► Northwest Airlines had decided to keep the full line Seattle plus after it had previously asked and been refused CAB permission to suspend CAB could lose it if it kept this route current but decided to go along. Company's April load factor of 69% compared with 75% a year ago.

► Island and Western Airlines has bought a DC-4 from Business-Air New region airline.

► Trans World Airlines had losses for May as 67% on international 79% domestic, compared with 71% and 77%, respectively, a year ago.

► United Air Lines had losses of 79% the first two days this month compared with 44% average for all of last year. New load factor of 71% compared with 76% a year ago. This increase passenger miles were 13% over a year ago at 108,993,000, and June 9 set a new record of 5,518,000 passenger miles, or more than \$400,000 for the day. Company shares Corner 346 on the West Coast as August, has 99 Centers on order. Has been placed in CAB about the American and Western threats permitting transfer of such passengers to standard low flights when each flight are canceled.

► Wisconsin Central Airlines reports a 46% gain in traffic this May over a year ago. The month's 15,081 passengers carried company with the previous month's 12,851 passengers, a year-over gain of 48%.

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## LETTERS

### They Protest

On page 98 under "Strictly Personal" you carry an "EXCLUSIVE" on "BTD's" I LANDED AT NEWARK by Joe Meigs' "Safe" Mags. . . It seems to me that a should have carried an editorial comment.

How we have an individual that is actively engaged as being a pilot, and a person who closely allied to an advisory capacity with CAA, his actions may do the side to the side and then says it was all to the point. Don't his automatic pilot and should not tell you that the right to prosecute the safety of everyone else in the sky who he really has no say.

Because he is a "volunteer" in CAA he is likely held at a closed airport (of all places—Bostons) to see a buddy with CAA? Did he off Tottenham to have them state that he had to go down below the rest on the way because of a low approach, thus eliminating the scenario by a search?

I have been associated with a major oil company as an aviation representative, flying a Boeing 747 for the past few years. During this period I have always been cognizant of the responsibilities I have with relation not only to my company but to the flying in general. Most of all pilots with whom I am associated feel that some responsibility. Along comes this character, connected with CAA, and puts a stunt like that.

Neil

R. E. Coxson  
824 Gower St.  
Toronto 1, Ohio

"We said that a new state of 'Tide' Mags is now the 12 month?" Just get to the automatic pilot on the ground of all air traffic and really the necessary paper. No case (of other traffic) to have land.

My Mags appears to be a CAA representative. (I'll be the safety device perhaps?)

R. E. Coxson  
Washington, D. C.

If you "Exclusives" story on Joe Meigs' CAA Mags in the May 11th issue is accurate, I would assume that his company's relation to CAA is not in the CAA Division.

It is my suggestion, since Mr. Meigs has a Little Automatic Pilot and an automatic pilot control that he complete his entry card with a suitable and competent pilot. Continued Pilot

### He Wants MiG Data

I am at present a lighter pilot for the United States Navy—working steady employment in some of these. However, while reading your recent editorial page I ran across a letter that caused me great mirth in the USAF. I suspect the experience of the MiG 15 from the Russians, for several reasons:

I could not easily get the information desired for publication here (how I would

know?) # is my business to know—these things.

OK, now, maybe the Navy and the Air Force and the Administration have allowed others in keeping this information from the public, because then the idea of this report would get very disturbed and make their business and flying lighter than was built in 1945 (and, in the case of the best or group being formed, 1945). Then they would do, I am sure, because they already know that there is a very little chance that their business will get to by anything that approaches the performance of the MiG 15 for long years to come.

Even then, although the performance figures of our X models are very expensive, as well as to be compared with the MiG 15, is a potential source.

Believe me when I say that I have no reason to pick with the Navy on this score. They have given me the best training possible with the equipment they have, which will make transition into our models of two years hence just a matter of technique, but the fact remains that the Administration has let the boys down that are fighting for their lives in overseas equipment.

R. D.

### First Missile Plant

While some commenters have been made some recent articles and letters discussing what (in the last year) has been the first to build a guided missile plant.

This company built an plant for guided missile development and production in 1942. This plant was constructed under Air Force sponsorship, but with company funds. The project was the result of the work of the late George Dillmore, and successfully succeeded through postwar service tests and pilot performance. So far as we are aware, it was the first warlike business model, but it was not yet into combat. Surely after the war he was permitted to raise the national policies on air work.

F. P. Conway, President  
Officer Electronics, Inc.  
1350 North Ridge Ave.  
Chicopee 2, MA

### "Informative"

In a recent *Aviation Week* I read with interest an article entitled, "FSA, United Colors, De Luce College" by Scott H. Koenig.

My I might offer my congratulations to you and Mr. Koenig. To me, having been for some years a pilot, as well as to others at Norton, this article presented so much and so much valuable information, a new concept of defense work in the world of air land. Such informative articles tend to keep us abreast of activities in related areas.

Edward T. Giverson, Public Relations  
Norton Instruments, Inc.  
117 Broad St.  
Milford, Conn.

### Research in Hiring?

Some time ago I wrote you a letter concerning my (unsuccessful) application for employment to vacuum firms in the aircraft industry. Since, I have made personal applications to two firms with totally different results.

In both cases I was accepted and offered a salary which was more than I expected. I began work within 10 days, when my present work finished. The firm, whose title I accepted, will give me ample opportunity to continue my work for an advanced degree in Industrial Science at a local university. My work with them will include test and analysis design, checking, and preparation of a senior training program under the supervision.

I think that the failure of my application by mail does clearly the following facts on the record:

- The students at the recent application form for housing are less the importance of a person's education and degree for a position.
- The education and lack of training and experience of many of our employment personnel, although it is a design and interpret the application form.
- The present short-sighted policy of many of our larger firms in refusing to employ persons over 45 years of age, in spite of the fact that such persons are at ground position of more experience and greater skill than the younger applicants and a shortage of experienced mechanics, technicians, and engineers does exist.
- The lack of proper testing systems to accurately determine a person's knowledge, skill and general fitness for the job for which he is applying.

I am an clearly an industrial field in which much research should be to be completed.

H. S. W.  
Williamstown, Mass.

### 'Objective Reporting'

As casually as I can say it, "There's very little in David Anderson's story of Apr. 28 on Goodrich. It's as clear as the fact of objective reporting, at the moment, plus being factually on the basis.

Bob Haines, Vice President  
Goodrich Company of America, Inc.  
Pittsfield, St. James 1, N. Y.

### Correction

[A typographical error in an editorial in this issue last week caused American Airlines Vice President William J. Moore to state that the U.S. airline industry is estimated for about \$117 million in new flight equipment for delivery between now and 1974. This amount figure is \$150 million. Moore estimated that another \$750 million can be required with interest of far less rapid—BLS.]



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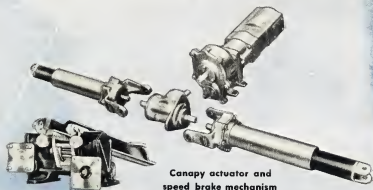
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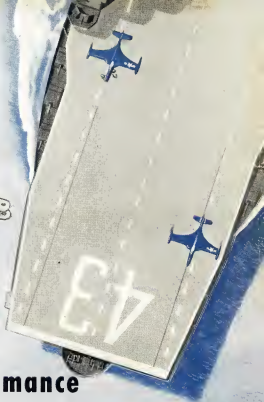
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